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REPORT NO. 1

SPECIAL VEGETATIVE STUDIES AND LAND CLASSIFICATION OF WATERSHED AREAS OF TWENTY-FOUR RANDOMLY SELECTED RESERVOIRS IN THE UPPER CHEYENNE RIVER DRAINAGE

(ABOVE ANGOSTURA RESERVOIR)

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Bureau of Land Management
Region III
Division of Land Planning

(Prepared by Cecil L. Hase and Rex S. ZoBell, Range Conservationists)

Study carried on as a feature of a comprehensive watershed investigation by the Department of the Interior Agencies under the Missouri River Basin program.

November, 1950

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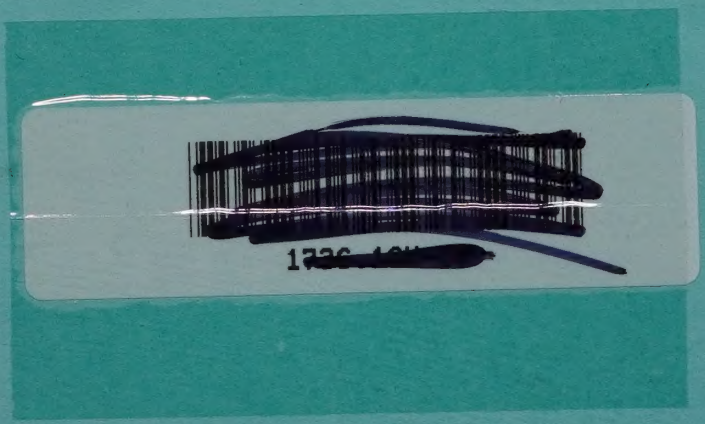

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Special Vegetative Studies and Land Classification of Watershed Areas of Twenty-four Randomly Selected Reservoirs in the Upper Cheyenne River Drainage (Above Angostura Reservoir)

This study was conducted to determine the amount of water and silt that may be expected in the Angostura Reservoir. The rate of silt deposition is the determining factor in the life of the reservoir and therefore, the economic feasibility of the project.

The U. S. Geological Survey, at the request of the Bureau of Reclamation, initiated a five per cent statistical study sample of the area above the Angostura Reservoir, to determine the amount of water retained by small stock-water reservoirs in the drainage area. The U. S. Geological Survey also studied the geology of the area and the rate of siltation in small stock-water reservoirs. Twenty-four reservoirs were selected at random in the various geological formations and varying topographic conditions. The U. S. Geological Survey found that vegetation was as important to the rate of silt deposition as were the geological formations of the area. They requested the Bureau of Land Management to make an ecological study of the area and to determine as nearly as possible the ecological trends of the areas under study. Two Range Conservationists from the Bureau of Land Management, Division of Land Planning, Mr. Cecil L. Mase and Mr. Rex S. McDell, were detailed to make the study. They conducted a land classification study to determine vegetative types, land capability and condition classes and erosion over the drainages tributary to each of the reservoirs under study.

The study was made October 16-20, 1950. This is not the most advantageous time to make such a study. Many plants have disappeared at this time of year and most remaining remnants are hard to identify. It is also difficult to determine plant vigor and reproduction this late in the year.

No aerial photographs were available to determine exact extent of types, therefore, the report is made more bulky by the necessary description of the areas.

It is believed that we will be able to obtain quantitative measures of erosion to tie our erosion classification to. This will be possible when the U. S. Geological Survey report is completed and the amount of silt produced over a period of years is known. From this information we will probably know whether or not we will have to adjust our erosion classification.

Andrews Reservoir - Sec. 6, T. 32 N., R. 55 W., Sioux County, Nebraska

The entire drainage area of this reservoir is in the White River formation, which is a continental deposit. Sheet and gully erosion are severe to critical where the cover is destroyed on this formation. The steep sides

Upper Cheyenne River Watershed Studies

Picture No. 1 October 17, 1950 By Rex S. ZoBell

LOCATION: Andrews Reservoir, Sec. 6, T. 32 N., R. 55 W., Sioux County, Nebraska

VIEW: General view of typical area above reservoir.

COMMENTS: Denuded portions of the White River formation on the main drainage of the Andrews Reservoir are shown here. The gully bottom is fairly well vegetated with only the sides being almost completely denuded. Erosional remnants, which can be seen in the center of the picture, have a good blue grama, needleandthread and threadleaf sedge cover. Exposed gully sides contribute practically all of the silt to the reservoir.

Upper Cheyenne River Watershed Studies

Picture No. 2 October 17, 1950

LOCATION: Andrews Reservoir, Sec. 6, T. 32 N., R. 55 W., Sioux County, Nebraska.

VIEW: General view of vegetative cover.

COMMENTS: Grazed vegetation on Andrews Reservoir drainage area. The drainage bottom is vegetated, but the gully sides are active, while the flats show little erosion. The two (2) foot ruler is two (2) inches in the ground. Blue grama has increased under grazing pressure, there is less needleandthread and threadleaf sedge; western wheatgrass has invaded along with a variety of forbs and big sagebrush. Density .5; 1.68 acres per A. U. M.

of the main draw are completely denuded and there is nothing to prevent a vast amount of silt from moving off. (see picture No. 1). This area, while small in comparison to the total area, no doubt produces the bulk of the silt. The runoff, from the flatter portions of the area, speeds up as it reaches these steeper areas and its cutting power is greatly increased. Much of the heavier material is deposited in the vegetation in the bottom of the draw and only the finer particles in suspension are deposited in the reservoir.

Between the steep sides of the draw and the flat lands is a relatively narrow area of gentle slopes. Water starts to concentrate and pick up velocity here, and sheet erosion is noticeable. (see picture No. 2). The remainder of the area is flat and there is little evidence of erosion.

Some wind erosion from what is now a crested wheatgrass (Agropyron cristatum) field has taken place in the past. This is evidenced by aeolian deposits on the east side of the field and this now supports a stand of Japanese bromegrass (Bromus japonicus).

Headwaters of the drainage are in the steep area of Pine Ridge. There is moderate erosion on the steep portions, while the gentle slopes have slight to moderate erosion. Erosion on the denuded areas of the main draw is rated as 4-1-3. Gentle slopes between this and the flat lands are rated as 3-1-1. Flat lands above are rated as 2-1-1, as are the gentler slopes of Pine Ridge. Erosion on the steep parts of Pine Ridge is rated as 3-1-2 1/.

Capability of the flat lands is rated as V good, while the main draw and the gentler slopes of Pine Ridge are rated as VI good. The steep slopes of the ridge are rated as VII fair. Capability of the steep denuded sides of the draw is classed as VIII. Topography is a limiting factor in all cases and unstable soils is an added factor on all except the V land. 2/.

Two vegetative types are found in this drainage. Lands adjacent to the reservoir support a good cover of grass, while Pine Ridge supports an open pine type with a good understory of grass. The grassland has a density of .6. This is mainly due to the increase in blue grama (Bouteloua gracilis) under grazing pressure

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1/ See table No. 3 (appendix) for description of the erosion classification.

2/ See table No. 1 for description of condition and table No. 2 for description of capability classes.

A Description of the Vegetative Composition of the Lower Drainage of Andrews Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	45	Good	Fair
Threadleaf Sedge	Carex filifolia	10	Fair	Fair
Needleandthread	Stipa comata	10	Fair	Poor
Buffalograss	Buchloe dactyloides	8	Fair	Poor
Japanese Brome	Bromus japonicus	6	Fair	Fair
Western Wheatgrass	Agropyron smithi	6	Fair	Fair
Fendler Threeawn	Aristida fendleriana	T	-	-
Sandberg Bluegrass	Poa secunda	T	-	-
Prairie Junegrass	Koeleria cristata	T	-	-
Little Bluestem	Andropogon scoparius	T	-	-
Muhly	Muhlenbergia spp.	T	-	-
Sideoats Grama	Bouteloua curtipendula	T	-	-
Prairie Sandreed	Calamovilfa longifolia	T	-	-
Sand Dropseed	Sporobolus cryptandrus	T	-	-
Perennial Ryegrass	Lolium perenne	T	-	-
Scarlet Globemallow	Sphaeralcea coccinea	5	Fair	Fair
Gayfeather	Liatris spp.			
Broom Snakeweed	Gutierrezia sarothrae			
Curlycup Gumweed	Grindelia squarrosa			
Sunflower	Helianthus spp.	5	Fair	Fair
Tumbling Russianthistle	Salsola tenuifolia			
Others	---			
Palmeterregon Sagebrush	Artemisia dracunculoides			
Fringed Sagebrush	Artemisia frigida	8	Fair	Fair
Plains Pricklypear	Opuntia polyacantha			
Silver Sagebrush	Artemisia cana			
Skunkbush Sumac	Rhus trilobata			
Common Snowberry	Symphoricarpos albus	5	Fair	Fair
Small Soapweed	Yucca glauca			
Rose	Rosa spp.			

Upper Cheyenne River Watershed Studies

Picture No. 3 October 17, 1950 By Cecil L. Hase

LOCATION: Andrews Reservoir, Sec. 6, T. 32 N., R. 55 W., Sioux County, Nebraska

VIEW: General view of vegetative cover.

COMMENTS: Climax vegetation as determined by isolated area set aside by a fence on one side and the rough breaks of the drainage leave small isolated areas where livestock cannot graze. Such areas as this give a fair indication as to the climax vegetation for the vicinity.

Litter on the ground is much in evidence in the climax. The two (2) foot ruler is one (1) inch in the ground. Needleandthread, threadleaf sedge and blue grama are the most abundant plants. Density .45; 1.48 acres per A. U. M.

Upper Cheyenne River Watershed Studies

Picture No. 4 October 17, 1950 By Cecil L. Hase

LOCATION: Andrews Reservoir, Sec. 6, T. 32 N., R. 55 W., Sioux County, Nebraska

VIEW: General view (upper drainage).

COMMENTS: A portion of Pine Ridge in the upper drainage of the Andrews Reservoir. Black Hills type ponderosa pine are scattered over the ridges with a good grass cover in the openings and under the trees. Some active gully erosion is taking place on the steeper drainages and sheet erosion is active on the exposed gully sides. Density .45; 2.66 acres per A.U.M. on openings, 4.54 acres per A.U.M. on ridges and gullies.

Climax association for the area was determined by study of an area in the vicinity which was protected from grazing. The following plants were found in this relict area:

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Needleandthread	Stipa comata	30	Good	Fair
Blue Grama	Bouteloua gracilis	15	Good	Fair
Threadleaf Sedge	Carex filifolia	40	Good	Fair
Buffalograss	Buchloe dactyloides	10	Good	Fair
Fendler Threeawn	Aristida fendleriana	T	-	-
Muhly	Muhlenbergia spp.	T	-	-
Other Grasses	---	T	-	-
Scarlet Globemallow	Sphaeralcea coccinea			
Selaginella	Selaginella spp.	5	Fair	Poor
Goldenrod	Aplopappus spp.			
Other Forbs	---			

(See picture No. 3)

Comparison of the vegetative composition on the two areas indicates that there is less needleandthread grass and threadleaf sedge and there is more blue grama and western wheatgrass on the grazed area. This is not a serious departure from the climax, but it does indicate what happens under the influence of grazing. If stocked at the recommended rate of about two acres per A. U. M. the condition should remain about the same or improve slightly.

At the time of the study the crested wheatgrass field was supporting a large part of the grazing, thus relieving the pressure on the native vegetation.

Pine Ridge supports an open pine (Pinus ponderosa) type, with an understory of grass. The understory of grass on the VI land of Pine Ridge has a slightly lower density than the grassland type, but the composition of the species comes nearer to the relict area used as climax . There is less needleandthread grass and considerably less threadleaf sedge than in the climax. The class VII portion of the type is much steeper and has many rock outcrops, (see picture No. 4). Composition of the species was approximately climax with some little bluestem and sideoats grama appearing in the type. There was little evidence of grazing in this type, which probably accounts for its favorable condition.

It is recommended that the VI portion of this type be stocked at about three acres per A. U. M. and about five acres per A. U. M. on the VII portion.

Plant associations for the area was determined by study of an area in the vicinity which was protected from grazing. The following plants were found in this relict area:

Common Name	Scientific Name	Composition	Vigor	Reproduction
		Per Cent		
Needleandthread	Stipa comata	30	Good	Fair
Blue Grama	Bouteloua gracilis	15	Good	Fair
Threadleaf Sedge	Carex filifolia	40	Good	Fair
Buffalograss	Buchloe dactyloides	10	Good	Fair
Scarlet Globemallow	Sphaeralcea coccinea	T	-	-
Dalea	Dalea spp.	T	-	-
Woolly Plantain	Plantago patagonica	T	-	-
Other Forbs	---	T	-	-
Western Wheatgrass	Agropyron smithii	5	Fair	Poor
Prairie Junegrass	Koeleria cristata	T	-	-
Sun Sedge	Carex heliophila	T	-	-
Other Grasses	---	T	-	-

(See picture No. 3)

Comparison of the vegetative composition on the two areas indicates that there is less needleandthread grass and threadleaf sedge and there is more blue grama and western wheatgrass on the grazed area. This is not a serious departure from the climax, but it does indicate what happens under the influence of grazing. It should be remembered that of about two acres per A. U. M. the condition should remain about the same or improve slightly.

At the time of the study the erected wheatgrass field was supporting a large part of the grazing, thus relieving the pressure on the native vegetation.

Pine Ridge supports an open pine (Pinus ponderosa) type, with an understory of grass. The understory of grass on the VI land of Pine Ridge is a slightly lower density than the grassland type, but the composition of the species seems nearer to the relict area used as climax. There is less needleandthread grass and considerably less threadleaf sedge than in the climax. The class VII portion of the type is much steeper and has many rock outcrops (see picture No. 4). Composition of the species was approximately the same with some little bluestem and sideoats grama appearing in the type. There was little evidence of grazing in this type, which probably accounts for its favorable condition.

It is recommended that the VI portion of this type be stocked at about three acres per A. U. M. and about five acres per A. U. M. on the VII portion.

A Description of the Vegetative Composition of the Upper Drainage of Andrews Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	30	Good	Fair
Needleandthread	Stipa comata	20	Good	Fair
Prairie Sandreed	Calamovilfa longifolia	10	Fair	Fair
Threadleaf Sedge	Carex filifolia	10	Fair	Fair
Little Bluestem	Andropogon scoparius	8	Good	Poor
Big Bluestem	Andropogon furcatus	2	Good	Poor
Green Needlegrass	Stipa viridula			
Western Wheatgrass	Agropyron smithi	6	Fair	Fair
Prairie Junegrass	Koeleria cristata			
Sideoats Grama	Bouteloua curtipendula	T	-	-
Fendler Threeawn	Aristida fendleriana	T	-	-
Japanese Brome	Bromus japonicus	T	-	-
Scarlet Globemallow	Sphaeralcea coccinea			
Fringed Sagebrush	Artemisia frigida			
Falsetarragon Sagebrush	Artemisia dracunculoides	10	Fair	Fair
Broom Snakeweed	Gutierrezia sarothrae			
Loco	Astragalus spp.			
Others	---			
Skunkbush Sumac	Rhus trilobata			
Small Soapweed	Yucca glauca			
Common Snowberry	Symphoricarpos albus	5	Fair	Fair
Rose	Rosa spp.			
Ponderosa Pine	Pinus ponderosa			
Eastern Poplar	Populus deltoides	T	-	-

A Description of the Vegetative Composition of the Upper Drainage of Andrews Reservoir

Common Name	Scientific Name	Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	80	Good	Fair
Needleandthread	Stipa comata	10	Good	Fair
Prairie Bluebird	Delphinium bicolor	10	Fair	Fair
Threadleaf Sedge	Carex filifolia	10	Fair	Fair
Alpine Bistort	Andropogon scoparius	8	Good	Poor
Big Bluestem	Andropogon furcatus	8	Good	Poor
Green Needlegrass	Stipa viridula			
Western Wheatgrass	Agropyron smithii	6	Fair	Fair
Prairie Junegrass	Koeleria cristata			
Blue Grama	Bouteloua curtipendula	T	-	-
Needle Threeawn	Aristida longiseta	T	-	-
Japanese Brome	Bromus japonicus	T	-	-
Curlleaf Cinquefoil	Sphaeralcea coccinea			
Fringed Sagebrush	Artemisia frigida			
Palebarreyan Sagebrush	Artemisia dracunculina	10	Fair	Fair
Brown Sandwood	Gutierrezia sarothrae			
Lava	Astragalus spp.			
Yellow	---			
Blackfoot Daisy	Erigeron divergens			
Small Fescue	Festuca idahoensis			
Common Snowberry	Symphoricarpos albus	5	Fair	Fair
Sand	Rosa spp.			
Meadowrue Flax	Thalictrum venulosum	T	-	-
Bracted Psyche	Psoralea tenuiflora			

Schaefer Reservoir - Sec. 12, T. 32 N., R. 56 W., Sioux County, Nebraska

This reservoir is also in the White River formation. It is similiar to that portion of the Andrews Reservoir drainage in Pine Ridge and the general discussion of that site holds true for the Schaefer Reservoir.

Erosion on the steep slopes of Pine Ridge is moderate to severe. The pine prevent some erosion, but in general are not too effective in holding back the silt. Old stock and game trails contribute heavily to the erosion conditions as evidenced by gullies formed along these trails. The steep slopes of Pine Ridge are rated as 3-1-2, while gentler slopes are rated as 2-1-1. The steep slopes of the Ridge are classed as VII capability, because of the topography and soils. The condition is rated as fair, because of the amount of erosion on the unstable soils. The flatter portions, at the base of the Ridge, are classed as VI capability; topography being the limiting factor. The condition is rated as good.

The steep ridges support a conifer type much the same as that on the Andrews Reservoir. The lower portions support a grassland type. However, there is some small soapweed and skunkbush sumac in this type that were not found in the Andrews site. The density is lower, .45.

Sylvester Reservoir - Sec. 12, T. 22 N., R. 22 E., Glenn County, California

This reservoir is also in the White River formation. It is similar to that portion of the Andrews Reservoir drainage in Pine Ridge and the general discussion of that site holds true for the Sylvester Reservoir.

Erosion on the steep slopes of Pine Ridge is moderate to severe. The pine present some erosion, but in general are not too effective in holding back the silt. Old stock and game trails contribute heavily to the erosion conditions as evidenced by gullies formed along these trails. The steep slopes of Pine Ridge are rated as D-4-E, while gentler slopes are rated as B-4-E. The steep slopes of the Ridge are classed as VII capability, because of the topography and soils. The condition is rated as fair, because of the amount of erosion on the unstable soils. The flatter portions, at the base of the Ridge, are classed as VI capability topography being the limiting factor. The condition is rated as good.

The steep ridges support a conifer type much the same as that on the Andrews Reservoir. The lower portions support a grassland type. However, there is some small scattered and chamise cover in this type that were not found in the Andrews site. The density is lower. 46.

A Description of the Vegetative Composition of the Schaefer Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	30	Good	Fair
Needleandthread	Stipa comata	30	Good	Fair
Sand Dropseed	Sporobolus cryptandrus	T	-	-
Threadleaf Sedge	Carex filifolia	10	Fair	Fair
Little Bluestem	Andropogon scoparius	8	Good	Poor
Big Bluestem	Andropogon furcatus	2	Good	Poor
Sat Sandbur	Cenchrus pauciflorus	T	-	-
Western Wheatgrass	Agropyron smithi	T	-	-
Prairie Sandreed	Calamovilfa longifolia	8	Fair	Fair
Sideoats Grama	Bouteloua curtipendula	T	-	-
Tumbling Russianthistle	Salsola tenuifolia			
Longleaf Phlox	Phlox longifolia			
Common Broadroot Scurfpea	Psoralea esculenta	10	Fair	Fair
Cudweed Sagebrush	Artemisia gnaphaloides			
Fringed Sagebrush	Artemisia frigida			
Lupine	Lupinus spp.			
Skunkbush Sumac	Rhus trilobata	3	Fair	Poor
Small Soapweed	Yucca glauca	2	Fair	Poor
Ponderosa Pine	Pinus ponderosa	T	-	-
Eastern Poplar	Populus deltoides	T	-	-
Willow	Salix spp.	T	-	-

By comparing this with the climax write-up it is noticable that blue grama is higher here. Threadleaf sedge is considerably lower and there is no buffalograss present. The amount of needleandthread grass is the same as on the climax area. The flatter portions have a carrying of about 2½ acres per A. U. M. A 40 per cent cut is recommended on the steeper portions, because of the slope.

A Description of the Vegetative Composition of the Baboquivari Reservoir

Common Name	Scientific Name	Composition Since Impoundment	
		Per Cent	
Pine Grass	Dentaloma gracilis	80	Good
Needlewhitewood	Ptilo arenaria	80	Good
Dock Dropseed	Sporobolus cryptandrus	2	-
Threadleaf Sedge	Carex filifolia	10	Fair
Little Bluestem	Andropogon scoparius	0	Good
Big Bluestem	Andropogon furcatus	2	Good
Ark Sandbur	Cenchrus pauciflorus	2	-
Western Wheatgrass	Agropyron smithii	2	-
Prairie Sandreed	Calamovilfa longifolia	8	Fair
Hideosia Grass	Hoteosium barbipedis	2	-
Rambling Nuttalmiella	Salsola kentuckia		
Leafleaf Pulse	Phlox longifolia		
Common Threadroot Sweetpea	Perulae aeculeata	10	Fair
Clustered Dogbrush	Arbutella graybialoba		
Prickpod Dogbrush	Arbutella prickiana		
Lupine	Lupinus spp.		
Standbush Cassa	Nima trifolata	3	Fair
Small Composed	Yucca glauca	8	Fair
Feathertop Pine	Pinus pauperum	2	-
Western Poplar	Populus deltoides	1	-
Willow	Salix spp.	2	-

By comparing this with the climax writeup it is probable that plus grass is higher here. Threadleaf sedge is somewhat lower and there is no buffalograss present. The amount of needleandthread grass is the same as on the climax area. The feather peatiness have a carrying of about 5½ acres per A. U. M. A 60 per cent cut is recommended on the steeper portions, because of the slope.

Kimbrough Reservoir - Sec. 24, T. 35 N., R. 64 W., Niobrara County, Wyoming

The drainage for this reservoir is in the White River formation, 90 per cent of which is barren badlands. The surprising fact is that the reservoir lasted for more than one good storm.

Erosion is severe to critical over the denuded area and there is no vegetation in the bottom of the drainage to slow down the water and cause the heavy particles to be deposited. Erosion on this area is rated as 4-1-4. The erosion on the benches is rated as 3-1-1, while on the crested wheat field it is 2-1-1.

Capability of the denuded area is classed as VIII; topography and soils are the limiting factors, while the remaining 10 per cent of the area is class VI land in fair condition--soil is the limiting factor.

Vegetative types in the area are "barren" and grassland. The barren type is in the class VIII land, while the grassland is found on the class VI land. The composition is near climax as can be seen by studying the following list of plants. Contour dikes and a lower rate of stocking, approximately seven acres per A. U. M., would improve the type. The crested wheat field is fenced out of the area and is cut for hay.

A Description of the Vegetative Composition of the Kimbrough Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	35	Fair	Poor
Threadleaf Sedge	Carex filifolia	25	Fair	Poor
Needleandthread	Stipa comata	10	Fair	Poor
Western Wheatgrass	Agropyron smithi	5	Fair	Poor
Sandberg Bluegrass	Poa secunda	T	-	-
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Prairie Junegrass	Koeleria cristata	T	-	-
Fendler Threeawn	Aristida fendleriana	T	-	-
Green Needlegrass	Stipa viridula	T	-	-
Broom Snakeweed	Gutierrezia sarothrae	10	Fair	Good
Curlycup Gumweed	Grindelia squarrosa			
Longleaf Phlox	Phlox longifolia			
Tumbling Russianthistle	Salsola tenuifola			
Eriogonum	Eriogonum spp.	10	Fair	Fair
Selaginella	Selaginella spp.			
Aster	Aster spp.			
Fringed Sagebrush	Artemisia frigida			
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Rubber Rabbitbush	Chrysothamnus nauseosus	T	-	-
Silver Sagebrush	Artemisia cana	T	-	-
Skunkbush Sumac	Rhus trilobata	T	-	-

Although some good grass species are present, the density is not very high, being only .25. Invader species are beginning to appear and apparently are spreading over the area. Many undesirable species are appearing and are on the increase. Apparently seedlings of desirable forage species do not have too much opportunity to establish themselves with the unstable soils and invader species are increasing.

A Description of the Vegetative Composition of the Kinsburg Reservoir

Common Name	Botanical Name	Composition	Per Cent Value	Recommendation
Blue Grass	Poaceae praelia	25	Fair	Poor
Horsetail Sedge	Carex hirtifolia	15	Fair	Poor
Needlegrass	Stipa comata	10	Fair	Poor
Western Wheatgrass	Agropyron smithii	8	Fair	Poor
Southern Wheatgrass	Tri aestivum	7	-	-
Indian Ricegrass	Oryzopsis hymenoides	7	-	-
Prairie Sheepgrass	Koeleria cristata	7	-	-
Prairie Threegrass	Aristida purpurea	7	-	-
Green Needlegrass	Stipa viridula	7	-	-
Brome Grasses	Bromus carinatus	10	Fair	Good
Curlycup Gumweed	Grindelia squarrosa			
Lanceleaf Elbow	Rumex hymenosepalus			
Fringed Sagebrush	Artemisia frigida			
Prairie Coneflower	Ratibida columnifera			
Dotted Gayfeather	Liatris punctata			
Scurfpea	Psoralea tenuiflora	12	Fair	Fair
Aster	Aster spp.			
Big Sagebrush	Artemisia tridentata	8	Fair	Fair
Rubber Rabbitbrush	Chrysothamnus nauseosus	7	-	-
Silver Sagebrush	Artemisia cana	7	-	-
Slimflower Scurfpea	Psoralea tenuiflora	7	-	-

Although some good grass species are present, the density is not very high, being only 45%. Lesser species are beginning to appear and apparently are spreading over the area. Many undesirable species are appearing and are on the increase. Apparently seedings of desirable forage species do not have too much opportunity to establish themselves with the undesirable soils and heavier species are increasing.

Coffee Reservoir - Sec. 21, T. 33 N., R. 56 W., Sioux County, Nebraska

The drainage area of this reservoir is in the White River formation. The same conditions exist in this area as existed in the Andrews site. The edges of the draws are denuded and are probably the heaviest silt contributers.

Erosion on the denuded areas is rated as 4-1-3, however, there is enough vegetation in the bottom to cause the heavier particles to deposit. The remainder of the area is rated as 2-1-1 on erosion. The crested wheat field has an erosion rating of 1-1-1. This field has a very high density (.8+) and this, in addition to the flatness of the field, seems to be very effective in preventing erosion.

The steep, denuded sides of the draw are rated as VIII capability; soil and topography being the limiting factors. The flatter portions are rated as VI in good condition; topography being the limiting factor. The crested wheatgrass hayland is classed as IV land in good condition; topography being the limiting factor 1/.

The vegetative type on the VIII is barren. The flat portion is grassland and appears to be approaching the climax for the area. The carrying capacity is about 1½ acres per A. U. M.

1/ Condition on hayland is rated vigor, density and production; while native grassland is rated on composition.

A Description of the Vegetative Composition of the Coffee Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Western Wheatgrass	Agropyron smithi	60	Good	Good
Buffalograss	Buchloe dactyloides	15	Good	Fair
Blue Grama	Bouteloua gracilis	10	Good	Fair
Needleandthread	Stipa comata	5	Fair	Poor
Kentucky Bluegrass	Poa pratensis	T	-	-
Japanese Brome	Bromus japonicus	5	Fair	Fair
Fendler Threeawn	Aristida fendleriana	T	-	-
Tumblegrass	Schedonnardus paniculatus	T	-	-
Rush	Juncus spp.	T	-	-
Threadleaf Sedge	Carex filifolia	5	Fair	Fair
Broom Snakeweed	Gutierrezia sarothrae			
Curlycup Gumweed	Grindelia squarrosa			
Sunflower	Helianthus spp.	5	Fair	Fair
Tumbling Russianthistle	Salsola tenuifolia			
Falsetarragon Sagebrush	Artemisia dracunculoides			
Cudweed Sagebrush	Artemisia gnaphalodes	5	Fair	Fair
Fringed Sagebrush	Artemisia frigida			
Licorice	Glycyrrhiza spp.			
Cocklebur	Xanthium spp.	2	Fair	Fair
Others		---		
Fourwing Saltbush	Atriplex canescens	T	-	-
Skunkbush Sumac	Rhus trilobata	T	-	-

Western wheatgrass is probably taking over as a grazing climax for this site, with a mixture of other grasses being about stabilized. Invader plants are present, but are not increasing at present. Wherever water is being spread out, there apparently has been a great increase in the amount of western wheatgrass.

A Description of the Vegetative Composition of the Duffus Reservoir

Common Name	Scientific Name	Composition	For Food Value	Characteristics
Western Waterweed	Elodea nuttalli	60	Good	Good
Buttercup	Ranunculus flabellaris	15	Good	Fair
Blue Grass	Poa pratensis	10	Good	Fair
Needlegrass	Stipa comata	5	Fair	Poor
Kentucky Bluegrass	Poa pratensis	3	-	-
Japanese Brome	Bromus japonicus	3	Fair	Fair
Prairie Sunflower	Helianthus petiolaris	2	-	-
Toadflax	Linaria vulgaris	2	-	-
Vetch	Vicia americana	2	-	-
Threadleaf Sedge	Carex filifolia	5	Fair	Fair
Brome Grass	Bromus marginatus			
Cattail	Typha latifolia	3	Fair	Fair
Bulrush	Scirpus validus			
Pickerelweed	Pontederia cordata			
Curled Dock	Rumex crispus	5	Fair	Fair
Fringed Sagebrush	Artemisia frigida			
Liverwort	Marchantia sp.			
Coontail	Ceratophyllum demersum	2	Fair	Fair
Water Milfoil	Myriophyllum sp.			
Prairie Sagebrush	Artemisia ludoviciana			
Blue Vervain	Verbena hastata	2	-	-
Bluejoint Grass	Calamagrostis canadensis	2	-	-

Sellers No. 2 Reservoir - Sec. 36, T. 45 N., R. 67 W., Weston County, Wyoming

This reservoir is located on the Lance formation which is brackish water deposit of interbeded black shale and sandstone.

Erosion is evidenced by grass pedicels and mounds in a part of the area. However, the material from this area probably does not move very far through the vegetation and only the part that goes into suspension is actually deposited in the reservoir. The majority of the silt load comes from wall-sloughing in the main draw and some of the side draws. While the drainage is quite long, the majority of the silt comes from the immediate area of the reservoir (¼ mile above). This is due to the wall-sloughing and concentration of stock near the water hole. This small area near the reservoir is rated as 2-1-2, while the overall erosion is rated as 2-1-1. Other factors affecting the erosion in the area of the reservoir are a fence corner in which the reservoir is located, and salt located near the water.

Capability of the area is rated as VI with topography being the limiting factor. The condition is only fair due to overgrazing. Better range management would spread grazing by placing salt away from the water hole.

Vegetation is of the grassland type. Overgrazing has caused an increase in grama and a decrease in needleandthread grass. The amount of western wheatgrass is about right for proper grazing use of the area. The carrying capacity is approximately four acres per A. U. M., and if the rancher would stock at that rate and salt away from water it would improve the range.

Bellevue No. 2 Reservoir - Loc. NE. ¼, SE. ¼ Sec. 8 T. 65 N., R. 6 W., Bowbells County, Dakota

This reservoir is located on the Lignite Formation which is overlain by several feet of interbedded black shale and sandstone.

Erosion is evidenced by great gullies and ravines in a part of the area. However, the material from this area probably does not move very far through the vegetation and only that part that goes into suspension is actually deposited in the reservoir. The majority of the silt load comes from wash-ing in the reservoir. The majority of the silt load comes from wash-ing in the main draw and some of the side draws. While the drainage is quite long, the majority of the silt comes from the immediate area of the reservoir (¼ mile above). This is due to the well-developed and concentrated sheet wash over the water basin. This small area near the reservoir is rated as 3-1-e, while the overall erosion is rated as 3-1-d. Other factors affecting the erosion in the area of the reservoir are a large acreage in which the reservoir is located, and soils located near the water.

Capability of the area is rated as VI with topography being the limiting factor. The condition is only fair due to overgrazing. Better range management would expand grazing by placing cattle only from the water hole.

Vegetation is of the grassland type. Overgrazing has caused an increase in grass and a decrease in mediumbunchgrass. The amount of western wheatgrass is about right for proper grazing use of the area. The carrying capacity is approximately four acres per A. U. M., and if the reservoir would stock at this rate and melt away from water it would improve the range.

A Description of the Vegetative Composition of the Sellers No. 2 Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	45	Fair	Fair
Western Wheatgrass	Agropyron smithi	15	Fair	Fair
Threadleaf Sedge	Carex filifolia	10	Fair	Poor
Needleandthread	Stipa comata	5	Fair	Poor
Prairie Junegrass	Koeleria cristata	5	Fair	Fair
Sandberg Bluegrass	Poa secunda			
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Green Needlegrass	Stipa viridula	T	-	-
Prairie Sandreed	Calamovilfa longifolia	T	-	-
Fringed Sagebrush	Artemisia frigida			
Broom Snakeweed	Gutierrezia sarothrae			
Pussytoes	Antennaria spp.			
Longleaf Phlox	Phlox longifolia			
Common Winterfat	Eurotia lanata	10	Fair	Fair
Pepperweed	Lepidium spp.			
Common Woody Aster	Aster xylorrhiza			
Scarlet Globemallow	Sphaeralcea coccinea			
Annual Atriplex	Atriplex spp.			
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Plains Pricklypear	Opuntia polyacantha	5	Fair	Fair
Silver Sagebrush	Artemisia cana	T	-	-
Fourwing Saltbush	Atriplex canescens	T	-	-

Desirable species are evenly distributed over the drainage area. Invader species, although present, are not increasing except on the disturbed areas.

A Description of the Vegetative Composition of the Saline Ra. 3 Reserve

Common Name	Scientific Name	Composition	Prs. Cent Value	Preference
Blue Grama	Bouteloua gracilis	45	Fair	Fair
Western Wheatgrass	Agropyron smithi	15	Fair	Fair
Threadleaf Sedge	Carex filifolia	10	Poor	Poor
Needle-and-thread	Stipa comata	8	Fair	Poor
Prairie Crocus	Anemone patens	5	Fair	Fair
Hairy Goldaster	Heterotheca villosa	3	-	-
Indian Ricegrass	Oryzopsis hymenoides	3	-	-
Green Needlegrass	Stipa viridula	3	-	-
Prairie Sandreed	Calamovilfa longifolia	3	-	-
Fringed Sagebrush	Artemisia frigida			
Prairie Sagewort	Artemisia cana			
Pasture Sage	Artemisia spp.			
Longleaf Phlox	Phlox longifolia			
Common Hedysarum	Hedysarum boreale	10	Poor	Fair
Peppergrass	Lepidium spp.			
Common Woody Aster	Aster sylvestris			
Smooth Gilia	Gilia leptantha			
Annual Astragalus	Astragalus spp.			
Big Bluegrass	Poa secunda	8	Fair	Fair
Plains Reedgrass	Calamagrostis montanensis	8	Fair	Fair
Silver Sagebrush	Artemisia cana	7	-	-
Pasture Saltbush	Atriplex canescens	7	-	-

Trailside species are evenly distributed over the drainage area. Meadow species, although present, are not interesting enough on the disturbed areas.

Upper Cheyenne River Watershed Studies

Picture No. 5 October 24, 1950

LOCATION: Sellers No. 1 Reservoir, Sec. 2, T. 44 N., R. 66 W., Weston County, Wyoming

VIEW: General view of vegetation above reservoir.

COMMENTS: Gentle, undulating, grass-covered hills make up the drainage area of Sellers No. 1 Reservoir. Some of the more level portions of the drainage are in crested wheatgrass hayfields. Density .35, 4.23 acres per A. U. M.

Upper Cheyenne River Watershed Studies

Picture No. 6 October 24, 1950

LOCATION: Sellers No. 1 Reservoir, Sec. 2, T. 44 N., R. 66 W., Weston County, Wyoming.

VIEW: Station No. 4

COMMENTS: A good grass cover is over the drainage area of the Sellers Reservoir. At the time of the photograph very little forage had been utilized. A six (6) inch pocket knife is standing by the wooden stake. Scattered sagebrush plants are spread over the area with a good understory of blue grama, needle-andthread and western wheatgrass and other plants. Density .35, 4.23 acres per A. U. M.

Sellers No. 1 Reservoir - Sec. 2, T. 44 N., R. 66 W., Weston County, Wyoming

The drainage for this reservoir is in the Lance formation. Erosion for the area runs about the same as on Sellers No. 2, except that part of the land is planted to crested wheatgrass. There is also a large area of saltgrass, which very effectively prevents erosion by its dense cover. The main channel is meandering, but the gentle slope and dense cover of grass holds soil loss to a minimum. (see picture No. 5). The area of crested wheatgrass and the flat area of saltgrass is rated as 1-1-1 on erosion. The remainder of the area is rated as 2-1-1.

The capability of the land in crested wheatgrass is classed as IV, it is producing a good stand of hay under dry land conditions. Topography is the limiting factor. The saltgrass flat is classed as V land. Alkali content of this soil is the limiting factor. The remainder of the area is classed VI land, with topography being the limiting factor. The condition of the V land is rated as good, while the VI land is in a high fair condition. The V land has a carrying capacity of approximately two acres per A. U. M. and the VI land will run about four acres per A. U. M.

Excluding the crested wheatfield there are two vegetative types in the area. The flat land is a grass type, with saltgrass the dominant species. The VI land supports a sagebrush type. (see picture No. 6).

Failure No. 1 Reservoir - Sec. 8, T. 44 N., R. 66 W., Weston County, Wyoming

The drainage for this reservoir is in the Lance formation. Erosion for the area runs about the same as on Failure No. 2, except that part of the land is planted to crested wheatgrass. There is also a large area of cultivated, which very effectively prevents erosion by its dense cover. The native ground is meandering, but the gentle slope and dense cover of grass holds soil loss to a minimum, (see picture No. 8). The area of crested wheatgrass and the flat area of saltgrass is rated as I-1-1 on erosion. The remainder of the area is rated as 2-1-1.

The capability of the land in crested wheatgrass is classed as IV, it is producing a good stand of hay under dry land conditions. Topography is the limiting factor. The saltgrass flat is classed as V land. Alkali content of this soil is the limiting factor. The remainder of the area is classed VI land, with topography being the limiting factor. The condition of the V land is rated as good, while the VI land is in a high fair condition. The V land has a carrying capacity of approximately two acres per A. U. M. and the VI land will run about four acres per A. U. M.

Moulding the crested wheatfield there are two vegetative types in the area. The flat land is a grass type, with saltgrass the dominant species. The VI land supports a sagebrush type, (see picture No. 8).

A Description of the Vegetative Composition for the Drainage Bottom of Sellers No. 1 Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Inland Saltgrass	Distichlis stricta	80	Good	Fair
Western Wheatgrass	Agropyron smithi	8	Good	Fair
Sandberg Bluegrass	Poa secunda	5	Fair	Fair
Needleandthread	Stipa comata	5	Fair	Poor
Prairie Cordgrass	Spartina pectinata	5	Good	Fair
Bottlebrush Squirreltail	Sitanion hystrix	T	-	-
Threadleaf Sedge	Carex filifolia	T	-	-
Blue Grama	Bouteloua gracilis	T	-	-

Grasses form almost a solid mat on this type. Due to the soil, saltgrass is probably climax for the type. There is little opportunity for new species or seedlings to become established on this type, and all the existing grasses are in good health and vigor.

A Description of the Vegetative Composition for the Drainage Notes
of Gallare No. 1 Reservoir

Cover Type	Botanic Name	Composition Per Cent	Vigor	Reproduction
Inland Saltgrass	Distichlis stricta	80	Good	Fair
Western Wheatgrass	Agropyron smithii	8	Good	Fair
Needle-and-Thread	Stipa comata	5	Fair	Fair
Prairie Cordgrass	Spartina pectinata	5	Good	Fair
Tufted Hairgrass	Deschampsia caespitosa	2	-	-
Nebraska Sedge	Carex nebrascensis	1	-	-
Blue Grass	Poa pratensis	1	-	-

Grasses form almost a solid mat on this type. Due to the soil, pasturage is probably oldest for the type. There is little opportunity for species or seedlings to become established as this type, and all the existing grasses are in good health and vigor.

A Description of the Vegetative Composition for the Area Above the Drainage Bottom for Sellers No. 1 Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	20	Good	Fair
Needleandthread	Stipa comata	15	Good	Fair
Western Wheatgrass	Agropyron smithi	15	Good	Fair
Threadleaf Sedge	Carex filifolia	10	Good	Fair
Inland Saltgrass	Distichlis stricta	8	Good	Fair
Sandberg Bluegrass	Poa secunda	8	Fair	Fair
Sixweeks Fescue	Festuca octoflora	T	-	-
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Prairie Junegrass	Koeleria cristata	T	-	-
Bottlebrush Squirreltail	Sitanion hystrix	T	-	-
Prairie Cordgrass	Spartina pectinata	T	-	-
Woolly Indianwheat	Plantago purshi			
Pepperweed	Lepidium spp.			
Tumbling Russianthistle	Salsola tamnifolia			
Curlycup Gumweed	Grindelia squarrosa			
Broom Snakeweed	Gutierrezia sarothrae	10	Fair	Fair
Wavyleaf Thistle	Cirsium undulatum			
Goosefoot	Chenopodium spp.			
Others				
Big Sagebrush	Artemisia tridentata	6	Fair	Fair
Fourwing Saltbush	Atriplex canescens			
Silver Sagebrush	Artemisia cana	5	Fair	Fair
Cudweed Sagebrush	Artemisia gnaphalodes			
Fringed Sagebrush	Artemisia frigida	T	-	-
Plains Pricklypear	Opuntia polyacantha	T	-	-

Forage plants are all of good vigor and producing a generous supply of available forage. There is evidence, as indicated by old sagebrush plants, that there has been some overgrazing in the past. At the present all desirable forage species do not indicate any grazing abuse, as evidenced by their good vigor, and invader species, while present, are not increasing.

A Description of the Vegetative Conversions for the Area Above the Drainage System for Gallery No. 1 Reservoir

Common Name	Botanical Name	Age Count	Conversion	Value	Reproduction
Pine Grove	Pinelawn Premilla	40	Good	Poor
Broadleaf-Mixed	Tilia Mimosa	15	Good	Poor
Feathery Monstrous	Aspergrove Conifol	30	Good	Poor
Thread-leaf Sedge	Carex filifolia	30	Good	Poor
Dwarf Saltgrass	Distichlis stricta	4	Good	Poor
Needlegrass Blue-grass	Poa pseudo	6	Poor	Poor
Common Prairie	Festuca ovinoides	5	-	-
Indian Ricegrass	Oryzopsis hymenoides	5	-	-
Alkali Sacaton	Sporobolus airoides	5	-	-
Switchgrass Foxtail	Panicum virgatum	5	-	-
Prairie Cordgrass	Spartina pectinata	5	-	-
Woolly Indianmint	Pycnanthemum			
Peppermint	Lophilum spp.			
Trailing Purple-fringe	Phlox canadensis			
Curlycup Gumweed	Grindelia squarrosa	10	Poor	Poor
Broom Snakeweed	Gutierrezia sarothrae			
Hary-leaf Thistle	Cirsium undulatum			
Cocklebur	Xanthium spp.			
Others	---			
Big Sagebrush	Artemisia tridentata	6	Poor	Poor
Pursing Saltbush	Atriplex canescens			
Silver Sagebrush	Artemisia cana	6	Poor	Poor
Cudweed Sagebrush	Artemisia ludoviciana			
Fringed Sagebrush	Artemisia frigida	7	-	-
Plains Prickly-pear	Opuntia polyacantha	7	-	-

Popham Reservoir - Sec. 24, T. 46 N., R. 67 W., Weston County, Wyoming

The drainage area of this reservoir is the Lance formation. The area appears to have been beaten down, probably during the drought. Erosion at present is rated at 2-1-1. In the past there was probably considerably more extensive erosion.

Capability of the drainage is rated as VI with topography the limiting factor. The condition is rated as fair.

The vegetation is of the grassland type. It is improving over what it has been in the past. Competition of grasses is slowly killing out the sagebrush. Many dead and weak sagebrush plants were observed. The carrying capacity is approximately four acres per A. U. M. If stocked at this rate it should continue to improve.

A Description of the Vegetative Composition of the Popham Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	40	Fair	Fair
Needleandthread	Stipa comata	15	Good	Fair
Threadleaf Sedge	Carex filifolia	10	Fair	Fair
Western Wheatgrass	Agropyron smithi	10	Good	Fair
Sandberg Bluegrass	Poa secunda	10	Fair	Fair
Sixweeks Fescue	Festuca octoflora	T	-	-
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Green Needlegrass	Stipa viridula	T	-	-
Buffalograss	Buchloe dactyloides	1	-	-
Broom Snakeweed	Gutierrezia sarothrae			
Woolly Indianwheat	Plantago purshi			
Wavyleaf Thistle	Cirsium undulatum			
Pussytoes	Antennaria spp.			
Lomatium	Lomatium spp.	10	Fair	Fair
Knotweed	Polygonum spp.			
Western Yarrow	Achillea lanulosa			
Stickseed	Lappula Lappula			
Others	---			
Big Sagebrush	Artemisia tridentata	5	Poor	Poor
Plains Pricklypear	Opuntia polyacantha	T	-	-
Silver Sagebrush	Artemisia cana	T	-	-

Invader species are not increasing . in fact, they appear to be decreasing while the more desirable forage species are showing a stronger vigor than average and are crowding out undesirable species. All this would tend to indicate that the range is improving over what it has been in the past.

A Description of the Vegetative Composition of the Peyton Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grass	Bouteloua gracilis	40	Fair	Fair
Needleandthread	Stipa comata	15	Good	Fair
Threadleaf sedge	Carex filifolia	10	Fair	Fair
Western Wheatgrass	Agropyron smithii	10	Good	Fair
Sandberg Bluegrass	Poa secunda	10	Fair	Fair
Blue Grama	Bouteloua gracilis	5	-	-
Indian Ricegrass	Oryzopsis hymenoides	5	-	-
Green Needlegrass	Stipa viridula	5	-	-
Bottlebrush	Sitanion hystrix	5	-	-
Green Rabbitbrush	Chrysothamnus nauseosus			
Woolly Indianwheat	Plantago purshii			
Waxyleaf Thistle	Cirsium undulatum			
Peashrub	Astragalus spp.			
Locoweed	Lupinus spp.	10	Fair	Fair
Knotweed	Polygonum spp.			
Western Yarrow	Achillea lanulosa			
Milkweed	Asclepias pumila			
Others	---			
Big Sagebrush	Artemisia tridentata	8	Poor	Poor
Plains Pricklypear	Opuntia polyacantha	7	-	-
Silver Sagebrush	Artemisia cana	5	-	-

Weather records are not interesting , in fact, they appear to be decreasing while the more desirable forage species are showing a strong vigor thus overgo and are creating our undesirable species. All this would tend to indicate that the range is improving over what it has been in the past.

Darlington Reservoir - Sec. 15, T. 43 N., R. 67 W., Weston County, Wyoming

The geological location of this reservoir is the Lance formation. Soil in this area seems to go into suspension and form "pipes" which causes a considerable amount of wall-sloughing. Erosional remnants of the edge of the draw are sometimes left as islands some distance from the receding banks. There is enough vegetation in the bottom to precipitate the heavier particles, while the material in suspension is deposited in the reservoir. The area along the edge of the draw is rated as 2-1-2 on erosion and accounts for only a minor part of the drainage. Although the remainder of the drainage is rated as 2-1-1, stock trails do cause some erosion, as evidenced by gullies formed along these old trails.

The capability of the flatter portions is classified as VI land in fair condition, topography and soils are the limiting factors. The narrow portion along the edge of the draw is classed as VII because of the topography, rock and unstable soil, and is in fair condition.

The land supports a grassland type of vegetation. It has a good density, however, it would be in better condition if there was less grama grass and more of the needleandthread grass. The VI land will have a carrying capacity of approximately five acres per A. U. M., while the remaining land will have about six acres per A. U. M.

The geological location of this reservoir is the large formation. soil in this area seems to be into sandstone and form "pipes" which cause a considerable amount of well-flooding. Structural remarks of the edge of the draw are sometimes left as islands some distance from the receding banks. There is enough vegetation in the bottom to prohibit the heavier particles while the material in suspension is deposited in the reservoir. The area along the edge of the draw is rated as S-1-2 on erosion and economic for only a minor part of the drainage. Although the remainder of the drainage is rated as S-4-3, sheet wrails do cause some erosion, as evidenced by gullies formed along these old trails.

The capability of the flatter portions is classified as VI land in their condition, topography and soils are the limiting factors. The narrow portions along the edge of the draw is classed as VII because of the topography, rock and unstable soil, and is in fair condition.

The land supports a grassland type of vegetation. It has a good density, however, it would be in better condition if there was less grass grass and more of the woodlandshrub grass. The VI land will have a carrying capacity of approximately five acres per A. U. M., while the remaining land will have about six acres per A. U. M.

A Description of the Vegetative Composition for the Darlington Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	40	Fair	Fair
Threadleaf Sedge	Carex filifolia	20	Fair	Poor
Western Wheatgrass	Agropyron smithi	10	Fair	Fair
Needleandthread	Stipa comata	5	Fair	Poor
Prairie Junegrass	Koeleria cristata	5	Fair	Fair
Sandberg Bluegrass	Poa secunda	5	Fair	Fair
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Bearded Bluebunch Wheatgrass	Agropyron spicatum	T	-	-
Scarlet Globemallow	Sphaeralcea coccinea			
Common Winterfat	Eurotia lanata			
Prairie Pepperweed	Lepidium densiflorum			
Broom Snakeweed	Gutierrezia sarothrae			
Pussytoes	Antennaria spp.	10	Fair	Fair
Loco	Astragalus spp.			
Fringed Sagebrush	Artemisia frigida			
Longleaf Phlox	Phlox longifolia			
Others	---			
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Plains Pricklypear	Opuntia polyacantha	5	Fair	Fair
Silver Sagebrush	Artemisia cana	T	-	-

Invader species are just beginning to show signs of increasing. Blue grama forms a sod over much of the area making it difficult for more desirable species to become established. The area is being somewhat overused at present as evidenced by the increase of blue grama and the lack of needleandthread. Big sagebrush and other undesirable species are present, but have not as yet indicated signs of increasing.

Common Name	Botanical Name	Per Cent Composition	Value	Abundance
Blue Grass	Poa pratensis	40	Fair	Fair
Threadleaf Sedge	Carex filifolia	20	Fair	Poor
Western Wheatgrass	Agropyron smithii	15	Fair	Fair
Needleandthread	Stipa comata	8	Fair	Poor
Prairie Junegrass	Koeleria cristata	8	Fair	Fair
Sandberg Bluegrass	Poa secunda	8	Fair	Fair
Smooth Brome	Bromus inermis	1	-	-
Western Wheatgrass "sod"				
Grass	Agropyron spicatum	1	-	-
Needle Threadgrass	Stipa comata			
Green Needlegrass	Stipa viridula			
Prairie Peppergrass	Lepidium densiflorum			
Threadleaf Sedge	Carex filifolia			
Fringed Sagebrush	Artemisia frigida			
Low Sagebrush	Artemisia arbuscula			
Lupine	Lupinus spp.			
Phlox	Phlox longifolia			
Locoweed	Astragalus spp.			
Others	---			
Big Sagebrush	Artemisia tridentata	8	Fair	Fair
Plains Prickly Pear	Opuntia polyacantha	8	Fair	Fair
Silver Sagebrush	Artemisia cana	1	-	-

Grasses and grasslike plants are the most important forage plants on the Northern Great Plains rangelands. Grasses are the most important forage plants on the Northern Great Plains rangelands. Grasses are the most important forage plants on the Northern Great Plains rangelands. Grasses

Field Brothers Reservoir - Sec. 17, T. 43 N., R. 66 W., Weston County, Wyoming

This is a grassland type on the Lance formation. A tight sod very effectively holds the soil in place and a good stand of vegetation in the bottom prevents the majority of silt from getting into the reservoir. The entire area is rated as 2-1-1-ni erosion.

The area is rated as VI capability in fair condition, topography is the limiting factor. The green grass is out of proportion to the rest of the vegetation; there should be less green, and a higher per cent of other grasses. The vegetation is of the grassland type with a .3 density. The estimated carrying capacity is approximately three and one-half acres per A. U. M.

A Description of the Vegetative Composition of the Field Brothers Reservoir

Common Name	Scientific Name	PER CENT Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	40	Fair	Fair
Western Wheatgrass	Agropyron smithi	15	Fair	Fair
Threadleaf Sedge	Carex filifolia	15	Fair	Poor
Needleandthread	Stipa comata	5	Fair	Poor
Sandberg Bluegrass	Poa secunda	5	Fair	Poor
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Prairie Junegrass	Koeleria cristata	T	-	-
Green Needlegrass	Stipa viridula	T	-	-
Scarlet Globemallow	Sphaeralcea coccinea			
Fringed Sagebrush	Artemisia frigida			
Prairie Pepperweed	Lepidium densiflorum			
Broom Snakeweed	Gutierrezia sarothrae			
Longleaf Phlox	Phlox longifolia			
Common Winterfat	Eurotia lanata	10	Fair	Fair
Pussytoes	Antennaria spp.			
Curlycup Gumweed	Grindelia squarrosa			
Woolly Indianwheat	Plantago purshi			
Others				
Silver Sagebrush	Artemisia cana	5	Fair	Fair
Plains Pricklypear	Opuntia polyacantha	5	Fair	Fair
Big Sagebrush	Artemisia tridentata	T	-	-
Gardner Saltbush	Atriplex gardneri	T	-	-

Due to grazing pressure there has been an increase of blue grama; other more desirable grasses are still present but are decreasing. Invading forbs and undesirable species are present, but have not as yet shown any signs of replacing the more desirable forage plants. Sod-forming characteristics of blue grama probably help to protect the area from too much overgrazing, but at the same time hinders reproduction of the more palatable plants.

A Description of the Vegetative Composition of the Vlei Protege Reserve

Common Name	Botanical Name	Composition	Vigor	Reproduction
Blue Grass	Bouteloua gracilis	40	Fair	Fair
Western Wheatgrass	Agropyron smithii	15	Fair	Fair
Threadleaf Sedge	Carex filifolia	15	Fair	Poor
Needleandthread	Stipa comata	8	Fair	Poor
Western Wheatgrass	Poa secunda	8	Fair	Poor
Indian Ricegrass	Oryzopsis hymenoides	2	-	-
Prairie Junegrass	Koeleria cristata	2	-	-
Green Needlegrass	Stipa viridula	2	-	-
Scarlet Globemallow	Sphaeralcea coccinea			
Fringed Sagebrush	Artemisia frigida			
Prairie Peppergrass	Lepidium densiflorum			
Prairie Sagewood	Gutierrezia sarothrae			
Longleaf Phlox	Phlox longifolia	10	Fair	Fair
Common Winterfat	Kerzia lanata			
Pasqueflower	Anemone sp.			
Curlycup Gumweed	Grindelia squarrosa			
Woolly Indianwheat	Plantago purshii			
Others	---			
Silver Sagebrush	Artemisia cana	5	Fair	Fair
Plains Prickly-pear	Opuntia polyacantha	3	Fair	Fair
Big Sagebrush	Artemisia tridentata	2	-	-
Western Daisybush	Aster ptarmicoides	1	-	-

One to grazing pressure there has been an increase of blue grama other more desirable grasses are still present but are decreasing. Invading forbs and undesirable species are present, but have not as yet shown any signs of replacing the more desirable forage plants. Good-forage evaporation of blue grama probably help to protect the area from too much evaporation, but at the same time hinders reproduction of the more palatable plants.

Upper Cheyenne River Watershed Studies

Picture No. 7 October 23, 1950

LOCATION: U. S. Government Reservoir, Sec. 28, T. 44 N., R. 64 W., Weston County, Wyoming

VIEW: General view of vegetative cover.

COMMENTS: A typical portion of the drainage area, showing the extensive grassland and erosional remnants in the Lance formation. Density .3; 3.33 acres per A. U. M.

Upper Cheyenne River Watershed Studies

Picture No. 8 October 23, 1950

LOCATION: U. S. Government Reservoir, Sec. 28, T. 44 N., R. 64 W., Weston County, Wyoming.

VIEW: Station No. 2.

COMMENTS: Typical vegetation of the drainage area which consists principally of blue grama, threadleaf sedge and needleandthread grass. Sagebrush and pricklypear plants are only occasionally seen, with grasses dominating the vegetation. Sheet erosion carries silt from this land. A six (6) inch scale is by the stake. Density .3; 3.33 acres per A. U. M.

U. S. Government Reservoir - Sec. 28, T. 44 N., R. 64 W., Weston County, Wyoming

This reservoir is located on the Lance formation. Except for a crested wheatgrass field, it is nearly the same as the Field Brothers Reservoir previously discussed. Erosion over the native vegetation is rated as 2-1-1 and on the crested wheatgrass field it is rated as 1-1-1. There are no gullies nor cut banks, but the bottom of the main draw has a few "pot holes" where water stands.

Topography is the limiting factor in capability, the land being classed as VI in fair condition.

This land supports a grassland vegetative type, (see picture No. 7). Grama grass has increased under grazing, while threadleaf sedge and needleandthread grass has decreased, (see picture No. 8). The carrying capacity is estimated at three and one-half acres per A. U. M.

U. S. Government Reservoir - Sec. 20, T. 44 N., R. 44 W., Weston County, Wyoming

This reservoir is located on the Lance formation. Except for a created wheatgrass field, it is nearly the same as the Field Brothers Reservoir previously discussed. Erosion over the native vegetation is rated as 2-1-1 and on the created wheatgrass field it is rated as 1-1-1. There are no gullies nor cut banks, but the bottom of the main draw has a few "pot holes" where water stands.

Topography is the limiting factor in capability, the land being classed as VI in its present condition.

This land supports a grassland vegetative type. (see picture No. 7). Crown grass has increased under grazing, while threadleaf sedge and needlegrass has decreased. (see picture No. 8). The carrying capacity is estimated at three and one-half acres per A. U. M.

A Description of the Vegetative Composition of the U. S. Government Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	45	Good	Fair
Needleandthread	Stipa comata	15	Fair	Fair
Threadleaf Sedge	Carex filifolia	15	Fair	Fair
Prairie Junegrass	Koeleria cristata	5	Fair	Fair
Sandberg Bluegrass	Poa secunda	5	Fair	Fair
Buffalograss	Buchloe dactyloides	5	Fair	Fair
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Sixweeks Fescue	Festuca octoflora	T	-	-
Prairie Sandreed	Calamovilfa longifolia	T	-	-
Bottlebrush Squirreltail	Sitanion hystrix	T	-	-
Inland Saltgrass	Distichlis stricta	T	-	-
Wavyleaf Thistle	Cirsium undulatum			
Fringed Sagebrush	Artemisia frigida			
Broom Snakeweed	Gutierrezia sarothrae	10	Fair	Fair
Prairie Peppergrass	Lepidium densiflorum			
Scarlet Globemallow	Sphaeralcea coccinea			
Others				
Big Sagebrush	Artemisia tridentata	T	-	-
Plains Prickly pear	Opuntia polyacantha	T	-	-

Grazing pressure is probably accounting for the amount of blue grama which is present, but there is still a good mixture of other desirable grasses present. Invader species are present, but they are not increasing in amounts. A good grass cover is distributed over the entire drainage area and only where there is a fence corner or other cause for disturbance are undesirable species appearing in any numbers.

A Description of the Vegetative Composition of the U. S. Government Reservoir

Common Name	Botanical Name	Per Cent Composition	Value for Waterfowling	
Blue Grass	Bouteloua gracilis	45	Good	Fair
Bentgrass/Sedge	Eatip cespita	15	Fair	Fair
Threesquare Sedge	Carex filifolia	15	Fair	Fair
Prairie Cordgrass	Scolaria uriaeta	8	Fair	Fair
Needlegrass Bluegrass	Poa pseudo	8	Fair	Fair
Buffalograss	Buchlon dactyloides	5	Fair	Fair
Indian Ricegrass	Oryzopsis hymenoides	3	-	-
Slimseed Fescue	Festuca octoflora	3	-	-
Prairie Sandreed	Calamovilfa longifolia	3	-	-
Scribners Dropseed	Sitanion hystrix	3	-	-
Indian Ricegrass	Piptochaetium avenacea	3	-	-
Barley Foxtail	Hordeum jubatum	3	-	-
Fringed Sagebrush	Artemisia frigida			
Prairie Sagebrush	Artemisia ludoviciana	10	Fair	Fair
Scarlet Globemallow	Sphaeralcea coccinea			
Sedge	Carex			
Big Sagebrush	Artemisia tridentata	7	-	-
Plains Prickly-pear	Opuntia polyacantha	7	-	-

Grazing pressure is probably accounting for the amount of blue grama which is present, but there is still a good mixture of other desirable grasses present. Weedier species are present, but they are not increasing in amounts. A good grass cover is distributed over the entire drainage area and only where there is a fence corner or other cause for disturbance are undesirable species appearing in any numbers.

Slagle No. 1 Reservoir - Sec. 27, T. 55 N., R. 66 W., Niobrara County, Wyoming

This is a sagebrush type on the Lance formation. The vegetation does a very good job of holding the soil in place, even the sharp slopes on the edge of the draw are well covered with vegetation. There has been some aeolian deposits from a cultivated field, which is just out of the drainage area. Erosion over the entire area is rated as 2-1-1.

The capability of this land is VI in a high fair or low good condition. Topography and soils are the limiting factors. Rougher portions in the south part of the drainage are rated as VII fair, with topography and soils being the limiting factors.

The vegetation is of sagebrush type with a carrying capacity of about four acres per A. U. M.

A Description of the Vegetative Composition for the Slagle No. 1 Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	25	Good	Fair
Western Wheatgrass	Agropyron smithi	20	Good	Fair
Threadleaf Sedge	Carex filifolia	15	Good	Fair
Sandberg Bluegrass	Poa secunda	5	Fair	Fair
Needleandthread	Stipa comata			
Green Needlegrass	Stipa viridula	10	Fair	Fair
Prairie Junegrass	Koeleria cristata	T	-	-
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Cheatgrass Brome	Bromus tectorum	T	-	-
Fendler Threeawn	Aristida fendleriana	T	-	-
Forbs	Antennaria spp.			
Broom Snakeweed	Gutierrezia sarothrae			
Curlycup Gumweed	Grindelia squarrosa			
Mariposa	Calochortus spp.			
Tumbling Russianthistle	Salsola tenuifolia	10	Fair	Fair
Loco	Astragalus spp.			
Longleaf Phlox	Phlox longifolia			
Dayfeather	Liatris spp.			
Others	---			
Big Sagebrush	Artemisia tridentata	10	Fair	Fair
Fourwing Saltbush	Atriplex canescens			
Rabbitbrush	Chrysothamnus spp.	T	-	-
Fringed Sagebrush	Artemisia frigida	T	-	-
Skunkbush Sumac	Rhus trilobata	T	-	-
Silver Sagebrush	Artemisia cana	T	-	-

Invader species are present on this site, but at the present are not increasing or spreading. Possibly there is just a little too much blue grama present and not enough of the needlegrasses; indicating that the grazing pressure should be eased up just a little. A good cover of grasses over the area indicates that grazing is not hindering the vegetation too much.

A Description of the Vegetative Composition for the Single Tee, 3 Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Desirability
Blue Grass	Poaceae spp.	55	Good	Fair
Western Bluestem	Agropyron smithii	30	Good	Fair
Perennial Rye	Lolium perenne	10	Good	Fair
Bentgrass Bentgrass	Agrostis spp.	5	Fair	Fair
Meadowsweet	Spiraea alba	10	Fair	Fair
Common Meadowrue	Thalictrum dasycarpum	5	-	-
Prairie Cinquefoil	Potentilla arguta	5	-	-
Indian Paintbrush	Castilleja coccinea	5	-	-
Common Yarrow	Achillea millefolium	5	-	-
Prairie Coneflower	Ratibida columnifera	5	-	-
Purple Prairie Clover	Petalostemum purpureum	5	-	-
Wild Bergamot	Monarda fistulosa	5	-	-
Blue Vervain	Verbena hastata	5	-	-
Canada Goldenrod	Solidago canadensis	5	-	-
Showy Goldenrod	Solidago speciosa	5	-	-
Stiff Goldenrod	Solidago rigida	5	-	-
Rough Blazing Star	Liatris aspera	5	-	-
Smooth Blazing Star	Liatris pycnostachya	5	-	-
Prairie Dock	Silphium terebinthinaceum	5	-	-
Compass Plant	Silphium laciniatum	5	-	-
Rosinweed	Silphium integrifolium	5	-	-
Cup Plant	Silphium perfoliatum	5	-	-
Ox-eye	Heliopsis helianthoides	5	-	-
Sneezeweed	Helenium autumnale	5	-	-
Ironweed	Vernonia fasciculata	5	-	-
Joe-Pye-Weed	Eupatorium maculatum	5	-	-
Boneset	Eupatorium perfoliatum	5	-	-
Tall Coreopsis	Coreopsis tripteris	5	-	-
Sunflower	Helianthus spp.	5	-	-
Prairie Sunflower	Helianthus pauciflorus	5	-	-
Maximilian Sunflower	Helianthus maximiliani	5	-	-
Compass Plant	Silphium laciniatum	5	-	-
Cup Plant	Silphium perfoliatum	5	-	-
Rosinweed	Silphium integrifolium	5	-	-
Ox-eye	Heliopsis helianthoides	5	-	-
Sneezeweed	Helenium autumnale	5	-	-
Ironweed	Vernonia fasciculata	5	-	-
Joe-Pye-Weed	Eupatorium maculatum	5	-	-
Boneset	Eupatorium perfoliatum	5	-	-
Tall Coreopsis	Coreopsis tripteris	5	-	-
Sunflower	Helianthus spp.	5	-	-
Prairie Sunflower	Helianthus pauciflorus	5	-	-
Maximilian Sunflower	Helianthus maximiliani	5	-	-

Number species are present on this site, but as the present are not increasing or spreading. Possibly there is just a little too much grass present and not enough of the needlegrasses; indicating that the grazing pressure could be eased up just a little. A good cover of grasses over the area indicates that grazing is not disturbing the vegetation too much.

Jons Reservoir - Sec. 5, T. 35 N., R. 67 W., Niobrara County, Wyoming

This is an overgrazed area of sagebrush on the Lance shales. An area of about 30 acres immediately adjacent to the reservoir has been severly overgrazed. Stock concentrate around the water, because the salting area is located right at the dam. Erosion on the area surrounding the reservoir is rated as 3-1-2 and the remainder of the area is rated as 2-1-2. Stock trails and roads cause the only gully erosion observed.

Capability of the area is classed as VII with topography and unstable soils being the limiting factors. The condition is classed as a low fair.

The vegetative type is classed as sagebrush with a density of .25. Improved range management would probably reduce the amount of sagebrush and increase the grass. The carrying capacity is approximately seven acres per A. U. M.

A Description of the Vegetative Composition of the Joes Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	25	Fair	Fair
Western Wheatgrass	Agropyron smithi	15	Fair	Fair
Threadleaf Sedge	Carex filifolia	15	Fair	Poor
Needleandthread	Stipa comata	5	Fair	Poor
Prairie Junegrass	Koeleria cristata	5	Fair	Fair
Sandberg Bluegrass	Poa secunda	5	Fair	Fair
Cheatgrass Brome	Bromus tectorum	5	Fair	Fair
Japanese Brome	Bromus japonicus			
Wendler Threeawn	Aristida fendleriana	T	-	-
Green Needlegrass	Stipa viridula	T	-	-
Inland Saltgrass	Distichlis stricta	T	-	-
Broom Snakeweed	Gutierrezia sarothrae			
Longleaf Phlox	Phlox longifolia			
Scarlet Globemallow	Sphaeralcea coccinea			
Fringed Sagebrush	Artemisia frigida			
Mariposa	Calochortus spp.	10	Fair	Fair
Pussytoes	Antennaria spp.			
Loco	Astragalus spp.			
Selaginella	Selaginella spp.			
Common Breadroot Scurfpea	Psoralea esculenta			
Others	---			
Big Sagebrush	Artemisia tridentata	10	Fair	Good
Plains Pricklypear	Opuntia polyacantha	5	Fair	Fair
Small Soapweed	Yucca glauca	T	-	-
Rose	Rosa spp.	T	-	-
Skunkbush Sumac	Rhus trilobata	T	-	-

Invader species are beginning to spread while the more desirable forage species are beginning to be seen as remnants in old big sagebrush and plains prickly pear clumps. On the disturbed areas, the annual bromes are starting to be one of the dominant species present. Big sagebrush is increasing, as evidenced by the increasing numbers of young plants present. The present trend of the vegetation is downhill, as evidenced by the increase of invader species.

A Description of the Vegetative Composition of the Adam Reservoir

Common Name	Botanical Name	Composition	Plant Performance	
		Per Cent		
Blue Grass	Poaceae pratile	60	Fair	Fair
Western Ryegrass	Agropyron smithii	15	Fair	Fair
Perennial Sedge	Carex filifolia	15	Fair	Fair
Needleandthread	Stipa comata	5	Fair	Poor
Prairie Dropseed	Sporobolus cryptandrus	5	Fair	Fair
Goldenrod Blazingstar	Liatris punctata	5	Fair	Fair
Cheatgrass Brome	Bromus tectorum	5	Fair	Fair
Japanese Brome	Bromus japonicus			
Prairie Threeawn	Aristida purpurea	2	-	-
Green Needlegrass	Stipa viridula	2	-	-
Inland Saltgrass	Distichlis stricta	2	-	-
Broom Snakeweed	Gutierrezia sarothrae			
Leafy Pinon	Pinus ponderosa			
Scarlet Globemallow	Sphaeralcea coccinea			
Striped Gayfeather	Liatris punctata			
Sagebrush	Artemisia spp.			
Cheatgrass	Bromus tectorum			
Prickly Pear	Opuntia spp.	10	Fair	Fair
Juniper	Juniperus spp.			
Yucca	Yucca glauca			
Rabbitbrush	Chrysothamnus spp.			
Common Horsetail Scouring Rush	Equisetum arvense			
Others	---			
Big Sagebrush	Artemisia tridentata	10	Fair	Good
Plains Prickly Pear	Opuntia polyacantha	8	Fair	Fair
Small Soapweed	Yucca glauca	2	-	-
Rose	Rosa spp.	2	-	-
Rabbitbrush Ericameria	Chrysothamnus viscidiflorus	2	-	-

Juniper species are beginning to spread while the more desirable forage species are beginning to be seen as removals in dry big sagebrush and plains prickly pear stands. In the disturbed areas, the annual brooms are starting to be one of the dominant species present. Big sagebrush is increasing, as evidenced by the increasing numbers of young plants present. The presence of the vegetation is downhill, as evidenced by the increase of juniper species.

Roscoe Ross Reservoir - Sec. 13, T. 36 N., R. 65 W., Niobrara County, Wyoming

This area is also in the Lance shales. Stock trails account for the gully erosion on the side hills. The bottom of the main draw supports a heavy stand of vegetation which effectively stops the silt once it gets into the main draw. Erosion over the area is rated as 3-1-2.

The flatter areas and the bottom of the main draw are VI capability and the remainder of the area is classed as VII. Topography is the limiting factor on both the VI and VII land.

Grassland is the vegetative type with blue grama the dominant species. The carrying capacity of the type is rated at approximately five acres per A. U. M.

A Description of the Vegetative Composition for the Roscoe Rose Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	30	Good	Fair
Western Wheatgrass	Agropyron smithi	20	Good	Fair
Threadleaf Sedge	Carex filifolia	15	Fair	Fair
Sandberg Bluegrass	Poa secunda	6	Fair	Fair
Needleandthread	Stipa comata	6	Fair	Fair
Cheatgrass Brome	Bromus tectorum	5	Fair	Fair
Japanese Brome	Bromus japonicus			
Alkali Sacaton	Sporobolus airoides	T	-	-
Prairie Junegrass	Koeleria cristata	T	-	-
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Green Needlegrass	Stipa viridula	T	-	-
Inland Saltgrass	Distichlis stricta	T	-	-
Longleaf Phlox	Phlox longifolia			
Common Dandroot Scurfpea	Psoralea esculenta			
Selaginella	Selaginella spp.			
Broom Snakeweed	Gutierrezia sarothrae			
Scarlet Globemallow	Sphaeralcea coccinea			
Fringed Sagebrush	Artemisia frigida	10	Fair	Fair
Loco	Astragalus spp.			
Lambert Crazyweed	Oxytropis lamberti			
Eriogonum	Eriogonum spp.			
Others	---			
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Plains Pricklypear	Opuntia polyacantha	5	Fair	Fair
Skunkbush Sumac	Rhus trilobata	T	-	-
Silver Sagebrush	Artemisia cana	T	-	-
Black Greasewood	Sarcobatus vermiculatus	T	-	-

Invader species present are not increasing in any significant amounts. Remnants of desirable grass species are scattered over the area. Blue grama, although present, still has not completely taken over the other more desirable grasses. Western wheatgrass is present in large enough amounts so that if given an opportunity it could increase easily.

A Description of the Vegetative Components for the Bunyan Area Reservoir

Common Name	Scientific Name	% Composition	Value for Cows	Recommendation
Blue Grass	Poaceae praelin	30	Good	Fair
Western Wheatgrass	Agropyron smithii	20	Good	Fair
Threadleaf Sedge	Carex filifolia	15	Fair	Fair
Needle Needlegrass	Stipa comata	8	Fair	Fair
Needleandthread	Stipa comata	8	Fair	Fair
Canadian Brome	Bromus pumpurus	5	Fair	Fair
Japanese Brome	Bromus japonicus			
Alkali Bentgrass	Agrostis alvotida	2	-	-
Prairie Junegrass	Koeleria cristata	2	-	-
Indian Ricegrass	Oryzopsis hymenoides	2	-	-
Green Needlegrass	Stipa viridula	2	-	-
Inland Saltgrass	Distichlis stricta	2	-	-
Longleaf Phlox	Phlox longifolia			
Common Threadnose Beardtongue	Penstemon secundiflorus			
Scheuchzeria	Scheuchzeria spp.			
Prairie Sandreed	Calamovilfa longifolia			
Smooth Goldenaster	Chrysopsis villosa			
Fringed Sagebrush	Artemisia frigida	10	Fair	Fair
Lupine	Lupinus spp.			
Lambert Crazyweed	Oxytropis lambertii			
Bryozoans	Bryozoa spp.			
Others	----			
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Plains Prickly-pear	Opuntia polyacantha	5	Fair	Fair
Shortstem Aster	Aster brachyactis	2	-	-
Silver Sagebrush	Artemisia cana	2	-	-
Black Greasewood	Sarcobatus vermiculatus	2	-	-

Number species present are not increasing in any significant amount.

Presence of desirable grass species are scattered over the area. Blue grass although present, still has not completely taken over the other more desirable grasses. Western wheatgrass is present in large enough amounts so that it given an opportunity it could increase easily.

Manning No. 1 Reservoir - Sec. 2, 11, T. 38 N., R. 68 W., Niobrara County, Wyoming

The rough drainage of this reservoir is in the Lance shales. The entire area is fairly well covered with vegetation, although an old road has eroded down to bedrock, forming rather shallow gullies. In other areas on the hills small rocks have been uncovered in the past, but no erosional pavements exist. The bottom of the draw and the side cuts are well healed.

The capability of the entire area is classed as VII, topography is the limiting factor. The condition is rated as fair, because there are several indicators of overgrazing, broom snakeweed being the most common.

This land supports a sagebrush type. It would improve over a period of time under proper stocking. An estimated stocking rate for this area is about four acres per A. U. M.

Manning No. 2 Reservoir - Sec. 1, 12, T. 38 N., R. 68 W., Niobrara County, Wyoming

This reservoir is also in the Lance formation. As in Manning No. 1, an old road has eroded down to bedrock and stock trails have caused some erosion. The sheet erosion is about the same as on the other area. A few rock outcrops were observed on the edges of the draw. Erosion was rated as 3-1-2 on this area. This is higher on the gullies than on the last reservoir, because of the increased gullies due to stock trails.

The area is rated as VII land with topography being the limiting factor. Condition is classed as a low fair. This is because of the increased broom snakeweed and sagebrush. It should be stocked at more than four acres per A. U. M.

A Description of the Vegetative Composition for the Manning No. 1 and No. 2 Reservoirs

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	36	Good	Fair
Western Wheatgrass	Agropyron smithi	20	Fair	Fair
Threadleaf Sedge	Carex filifolia	15	Good	Fair
Prairie Junegrass	Koeleria cristata	5	Fair	Fair
Japanese Brome	Bromus japonicus	5	Fair	Fair
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Needleandthread	Stipa comata	T	-	-
Sandberg Bluegrass	Poa secunda	T	-	-
Bearded Bluebunch Wheatgrass	Agropyron spicatum	T	-	-
Fringed Sagebrush	Artemisia frigida			
Broom Snakeweed	Gutierrezia sarothrae			
Scarlet Globemallow	Sphaeralcea coccinea			
Longleaf Phlox	Phlox longifolia			
Pussytoes	Antennaria spp.	10	Fair	Fair
Crazyweed	Oxytropis spp.			
Mariposa	Calochortus spp.			
Lupine	Lupinus spp.			
Cudweed Sagebrush	Artemisia gnaphalodes			
Others				
Big Sagebrush	Artemisia tridentata	10	Fair	Fair
Small Soapweed	Yucca glauca			
Silver Sagebrush	Artemisia cana			
Rose	Rosa spp.	5	Fair	Fair
Skunkbush Sumac	Rhus trilobata			
Common Snowberry	Symphoricarpos albus			

Invader species are beginning to increase over the amounts which are present under moderate use. Blue grama is spread over the area and in some instances is forcing more desirable species out; grazing pressure is probably favoring the blue grama since it does not tend to be abused by grazing as easily as other more desirable grasses. Big sagebrush and a large variety of weeds are scattered over the site and probably will increase if the range is overused.

Common Name	Botanical Name	Composition	Value for Pasturage
Blue Grass	Poa pratensis	50	Good
Western Wheatgrass	Agropyron smithii	20	Fair
Threadleaf Sedge	Carex filifolia	15	Good
Prairie Junegrass	Koeleria cristata	5	Fair
Japanese Brome	Bromus japonicus	5	Fair
Indian Ricegrass	Oryzopsis hymenoides	2	-
Needleandthread	Stipa comata	1	-
Needlegrass Elongatus	Poa secunda	1	-
Smallhead Bluebunch Wheat-			
grass	Agropyron spicatum	1	-

Fringed Sagebrush	Artemisia frigida			
Prairie Sagebrush	Artemisia cana			
Silver Sagebrush	Artemisia cana	5	Fair	Fair
Rose	Rosa sp.			
Wolfberry	Symphoricarpos albus			

Heavier species are beginning to increase over the acreage which previously under pasture use. Blue grass is spread over the area and in some instances is forming core desirable sites only. Grazing pressure is probably controlled by the fencing. Big sagebrush and a large variety of weeds are scattered over the site and probably will increase if the range is overrun.

Slagle No. 2 Reservoir - Sec. 29, T. 39 N., R. 65 W., Niobrara County, Wyoming

The grass-covered hills of the drainage area of this reservoir are all in the Fort Union geological formation. Silt which reaches the reservoir comes mostly from the rougher, raw portions of the gully edges, where the silt is picked up by sloughing-off a small, steep portion and then washing it down the draws into the reservoir itself. There is some movement of silt through the grass, but it moves only a very short distance with each runoff. The bottoms of the drainage all show evidences of deposition of silt, and the cattle grazing up these bottoms do not give the grasses too much opportunity to recover completely and heal the bottoms as thoroughly as they should be. Salting at the reservoir has created some overgrazing near the reservoir itself and the resultant depleted density accounts for some sheet erosion. The more broken-up, rougher drainage edges and breaks were rated at 3-1-1 on erosion; this area is the largest contributor of silt to the reservoir. The grassed hills and flats were rated at 2-1-1, there is some movement of silt through the grass, but it is not too active, being largely arrested by the good grass cover.

The land in the drainage area is all of about the same general character and topography. Some of the hills are a little steep to be effectively grazed by livestock, but the cattle cover the rolling hills and benches without too much difficulty. The entire drainage was rated at VI with topography being the only limiting factor. It is a high fair or low good condition.

Vegetation is chiefly a grassland with some big sagebrush scattered over the area. There is a good mixture of grasses present, although blue grama is the most evident. There are starts of green needlegrass and needle-and-thread grass intermixed in the blue grama sod and the sagebrush. Although the sagebrush is present, it does not appear to be spreading at present and it has a good grass understory.

Under proper use to maintain the vegetation in a good condition this drainage should be stocked at a rate of about three and one-half acres per A. U. M. To obtain better distribution of stock on this pasture of Slagles', more reservoirs could be constructed on other drainages to alleviate the grazing pressure on the existing watering places. Salting could be done on the ridges away from the reservoirs. Antelope do some grazing in this area, but at present they are not much of a problem.

The grass-covered hills of the drainage area of this reservoir are all in the West Union Geological Formation. Silt which reaches the reservoir comes mostly from the ravines, ran portions of the gully edges, where the soils is picked up by sloughing-off & small, steep portions and then washing it down the draws into the reservoir itself. There is some movement of silt through the grass, but it moves only a very short distance with each rainfall. The presence of the drainage all show evidences of deposition of silt, and the gentle grading up these bottoms do not give the grasses too much opportunity to recover completely and bind the bottoms as thoroughly as they should be. Settling at the reservoir has created some overgrazing near the reservoir itself and the resultant depleted density accounts for some minor erosion. The more problem, however drainage edges and draws were rated at S-1-1 as creating this area is the largest contributor of silt to the reservoir. The grassed hills and flats were rated at S-1-1. There is some movement of silt through the grass, but it is not too active, being largely arrested by the good grass cover.

The land in the drainage area is all of about the same general character and topography. Some of the hills are a little steep to be effectively grazed by livestock, but the gentle hills and bottoms without too much difficulty. The gentle drainage was rated at VI with topography being the only limiting factor. It is a high fair or low good condition.

Vegetation is mainly a grassland with some big sagebrush scattered over the area. There is a good mixture of grasses present, although blue grass is the most evident. There are stands of grass sedge/grass and meadow oniongrass intermixed in the blue grass sod and the sagebrush. Although the sagebrush is present, it does not appear to be spreading at present and is not a good grass undertaker.

Under proper use to maintain the vegetation is a good condition this drainage should be stocked on a rate of sheep three and one-half acres per A. U. M. To obtain better distribution of stock on this pasture of sloping, more reservoirs could be constructed on other drainages to alleviate the grazing pressure on the existing watering places. Salting could be done on the ridges away from the reservoirs. Hedgehope do have grazing in this area, but at present they are not much of a problem.

A Description of the Vegetative Composition for the Slagle No. 2 Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	60	Good	Good
Threadleaf Sedge	Carex filifolia	35	Good	Fair
Needleandthread	Stipa comata	5	Fair	Fair
Western Wheatgrass	Agropyron smithi	5	Fair	Fair
Green Needlegrass	Stipa viridula	T	-	-
Prairie Junegrass	Koeleria cristata	T	-	-
Sandberg Bluegrass	Poa secunda	T	-	-
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Sixweeks Fescue	Festuca octoflora	T	-	-
Fendler Threeawn	Aristida fendleriana	T	-	-
Japanese Brome	Bromus japonicus	T	-	-
Thickspike Wheatgrass	Agropyron dasystachyum	T	-	-
Common Winterfat	Eurotia lanata			
Longleaf Phlox	Phlox longifolia			
Scarlet Globemallow	Sphaeralcea coccinea			
Broom Snakeweed	Gutierrezia sarothrae	5	Fair	Fair
Fringed Sagebrush	Artemisia frigida			
Woolly Indianwheat	Plantago purshi			
Pussytoes	Antennaria spp.			
Others				
Big Sagebrush	Artemisia tridentata	5	Good	Fair
Silver Sagebrush	Artemisia cana	T	-	-
Plains Prickly pear	Opuntia polyacantha	T	-	-

Lee Moore Reservoir - Sec. 17, T. 36 N., R. 68 W., Converse County, Wyoming

The drainage area of the Moore Reservoir consists of sagebrush hills with several outcroppings in the Fort Union formation. Silt reaches the reservoir from a number of different areas on the drainage. There are many bare areas of shale where water picks up volume and velocity and its cutting power is increased. A soft, friable sandstone is found beneath some of the shale areas and the sandstone breaks down rapidly, contributing a fine sand which is picked up and carried by water down toward the reservoir. Side bank-cutting and sloughing-off are evident on the main drainage bottoms. The entire area is not vegetated, there are many bare areas where water concentrates and there is no vegetation to hinder its flow or cutting power. Erosion was rated 3-1-2. The hard bedrock near the surface probably is a factor in holding back the gully erosion.

The entire drainage area is fairly rough and cut up with numerous outcroppings of rocks. Livestock can cover the entire drainage area, but caution should be exercised in grazing the area due to the topography.

Since it is about all of the same general character, the capability of the land is rated at VII for the entire area. Soil and topography are the limiting factors to the capability. Considering the limited amount of soil and what the area could support, this drainage was given a fair condition.

Vegetation is scattered on this drainage, but it has the general aspect of a sagebrush land with a grass understory. Many weeds are in evidence and other annual plants all indicating that there is a disturbance of the soil and also possibly some overgrazing of the area. On some of the flatter portions blue grama grass is forming a sod and there are some scattered plants of western wheatgrass, especially on the bottoms where moisture is available.

The land is capable of supporting about one cow for each seven acres of land in the drainage area. Wildlife, antelope and deer in particular, probably obtain more use from the areas similar to this than is suspected, since they do offer good cover in addition to the scattered forage.

Lee Vore Reservoir - Sec. 17, T. 58 N., R. 61 W., Converse County, Wyoming

The drainage area of the Moore Reservoir consists of moderate hills with several outcroppings in the Fort Union Formation. Silt remains the serious item a number of different areas in the drainage. There are many bare areas of mixie where water plods up veloes and velocity and its cutting power is increased. A early, friable sandstone is found beneath some of the mixie areas and the sandstone breaks down rapidly, contributing a fine sand which is picked up and carried by water down toward the reservoir. Side back-cutting and sloughing-off are evident on the main drainage bottoms. The entire area is not vegetated, there are many bare areas where encroachments and there is no vegetation to hinder the flow or cutting power. Erosion was rated 3-1-2, the hard bedrock near the surface probably is a factor in holding back the gully erosion.

The entire drainage area is fairly rough and cut up with numerous outcroppings of rocks. Livestock can cover the entire drainage area, but caution should be exercised in grazing the area due to the topography.

Since it is about all of the same general character, the capability of the land is rated as VII for the entire area. Soil and topography are the limiting factors to the capability. Considering the limited amount of soil and what the area could support, this drainage was given a fair condition.

Vegetation is scattered on this drainage, but is ten the general aspect of a sagebrush land with a grass understory. Many weeds are in evidence and other annual plants all indicating that there is a disturbance of the soil and also possibly some overgrazing of the area. On some of the flatter portions grass is growing a and and there are some scattered plants of western wheatgrass, especially on the bottoms where moisture is available.

The land is capable of supporting about one cow for each seven acres of land in the drainage area. WILDLIFE, sagebrush and deer in particular, probably obtain more use from the grass similar to this than is suspected, since they do offer good cover in relation to the scattered brush.

A Description of the Vegetative Composition for the Lee Moore Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	35	Fair	Fair
Needleandthread	Stipa comata	10	Fair	Fair
Western Wheatgrass	Agropyron smithi	10	Good	Fair
Prairie Junegrass	Koeleria cristata	5	Fair	Fair
Japanese Brome	Bromus japonicus	5	Fair	Fair
Sandberg Bluegrass	Poa secunda	5	Fair	Poor
Fendler Threeawn	Aristida fendleriana	5	Fair	Fair
Green Needlegrass	Stipa viridula	T	-	-
Threadleaf Sedge	Carex filifolia	T	-	-
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Little Bluestem	Andropogon scoparius	T	-	-
Scarlet Globemallow	Sphaeralcea coccinea			
Woolly Indianwheat	Plantago purshi			
Longleaf Phlox	Phlox longifolia			
Broom Snakeweed	Gutierrezia sarothrae			
Fringed Sagebrush	Artemisia frigida	10	Fair	Fair
Lambert Crazyweed	Oxytropis lamberti			
Curlycup Gumweed	Grindelia squarrosa			
Common Broomroot Scurfpea	Psoralea esculenta			
Common Woody Aster	Aster xylorrhiza			
Others	---			
Big Sagebrush	Artemisia tridentata	10	Fair	Fair
Plains Pricklypear	Opuntia polyacantha	5	Fair	Fair
Small Soapweed	Yucca glauca	T	-	-
Black Greasewood	Sarcobatus vermiculatus	T	-	-
Silver Sagebrush	Artemisia cana	T	-	-
Skunkbush Sumac	Rhus trilobata	T	-	-
Rubber Rabbitbrush	Chrysothamnus nauseosus	T	-	-

Common Name	Botanical Name	Competitive Tiger Mosquito
Pine Grass	Panicum virgatum	Fair
Needlegrass	Stipa comata	Fair
Western Wheatgrass	Agropyron smithii	Good
Prairie Junegrass	Koeleria cristata	Fair
Japanese Brome	Bromus japonicus	Poor
Smallseed Bluegrass	Poa occulta	Poor
Foothill Fescue	Festuca idahoensis	Fair
Green Needlegrass	Stipa viridula	-
Threadleaf Sedge	Carex filifolia	-
Indian Ricegrass	Oryzopsis hymenoides	-
Little Bluestem	Andropogon scoparius	-
Dwarf Chamaelirium	Xerophyllum asphodeloides	
Basal Indianpaint	Plantago purpurea	
Longleaf Phlox	Phlox longifolia	
Brown Trumpet	Fritillaria atropurpurea	
Frigid Townsendia	Townsendia hookeri	
Lambert Crazyweed	Oxytropis lambertii	
Curlycup Gumweed	Grindelia squarrosa	
Common Threadleaf Groundsel	Senecio canus	
Common Woolly Aster	Aster sibiricus	
Sego Lily	Calochortus nuttallii	
Big Sagebrush	Artemisia tridentata	Poor
Plains Prickly Pear	Opuntia polyacantha	Fair
Small Soapweed	Yucca glauca	-
Black Greasewood	Sarcobatus vermiculatus	-
Silver Sagebrush	Artemisia cana	-
Shadscale Chenopodium	Atriplex confertifolium	-
Winter Fatbrush	Eurotia lanata	-

Schmitt Brothers Reservoir - Sec. 35, T. 40 N., R. 67 W., Niobrara County, Wyoming

The rolling hills of the reservoir are located on the Fort Union shales. Erosion on this drainage is largely sheet and gully erosion, with possibly the gully erosion, which exists in the form of side bank-cutting on the main and side draws, contributing the bulk of the silt to the reservoir. There is some material which goes into solution which also reaches the reservoir after running off from the grassy hills and benches. Gullies in the drainage are not very wide and are usually shallow, but there is some side cutting taking place. There are a few bare areas in the drainage where decomposed shale is exposed and some active sheet erosion will take place here. Erosion for the entire drainage is rated as S-1-2, with the gullies contributing the most silt to the reservoir. Some silt moves through the grass and vegetation, but it only travels a short distance with each succeeding runoff. The land is all of about the same general nature, with some rolling hills and a few benches, which are not too steep for livestock to graze the entire drainage area, but due to the topography the land was rated as VI.

The evidences of active gully erosion and the appearance of some undesirable weed species indicates that this area is in a fair condition. Possibly the convenience in location, of being close to the ranch headquarters, helps to contribute to excessive use of the drainage area and keeps it in a fair condition.

Vegetation in the drainage is a sagebrush type with a good grass understory. Several indicator plants of overgrazing are starting to come in, but as yet are not present in any significant amounts; however, they do indicate the trend toward which the vegetation is tending to go.

About five acres on the drainage will support one cow for a month at the present, but with the continued use this drainage is receiving, it will probably take more acres per animal in the future.

A Description of the Vegetative Composition for the Schmitt Brothers Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	45	Good	Fair
Western Wheatgrass	Agropyron smithi	15	Fair	Fair
Threadleaf Sedge	Carex filifolia	15	Fair	Fair
Needleandthread	Stipa comata	5	Fair	Poor
Prairie Junegrass	Koeleria cristata	T	-	-
Sandberg Bluegrass	Poa secunda	T	-	-
Broom Snakeweed	Gutierrezia sarothrae			
Longleaf Phlox	Phlox longifolia			
Fringed Sagebrush	Artemisia frigida			
Scarlet Globemallow	Sphaeralcea coccinea			
Curlycup Gumweed	Grindelia squarrosa	10	Good	Good
Sunflower	Helianthus spp.			
Loco	Astragalus spp.			
Common Winterfat	Eurotia lanata			
Buffalobur Nightshade	Solanum rostratum			
Others	---			
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Plains Pricklypear	Opuntia polyacantha	5	Fair	Fair

Danks Reservoir - Sec. 17, T. 10 S., R. 4 E., Black Hills Meridian, Fall River County, South Dakota

Grassy hills with some scattered sagebrush comprise the drainage area of the Danks Reservoir which is on a gumbo shale formation.

Along the main drainage there are some rough gully edges and a few small headcuts, but sheet erosion on the steeper slopes and near the gully breaks probably accounts for the majority of silt reaching the reservoir. There are some barren areas where decomposed shale is exposed; these areas concentrate some water and increase the erosive power, but since the drainage area is not very large, this is not too serious. There is some movement of silt through the pond, but it is carried only a short distance and only that portion which goes into suspension actually reaches the reservoir. A thick blue grass sod is doing a fairly good job of restricting sheet erosion on the flatter portions away from the drainage breaks and this area was rated at 2-1-1.

Two different types of land make up the drainage area, the drainage breaks and the remaining flatter portions. The drainage breaks were rated as VII land with the unstable soils and topography being the limiting factors. The remaining flatter portions, although taking in some hilly portions, were rated at VI with topography and soils being the limiting factors. On the whole, the drainage area is all of about the same general character with only the drainage breaks and bare spots differing from the remainder.

At the present time the drainage area is in fair condition, it has been in better condition in the past and the present trend is downhill. There are increasing amounts of undesirable species appearing, sagebrush and snakeweed seedlings, compared to the amounts which should be present for the range to be in good condition. The convenient location close to the ranch headquarters and salting at the water, both are influencing the condition of the range in this drainage.

At the present time the vegetation is largely a grassland with some scattered sagebrush. There are remnants of desirable grass species in sagebrush and prickly-pear clumps, indicating that there have been better grasses growing in the area. With less grazing pressure and favorable growth years, the desirable species could increase and improve the range.

At the present stocking rate there should be a little more than three acres per cow, but apparently the range is overstocked, at least on this drainage area because there are numerous sagebrush and snakeweed seedlings just starting to appear. Better distribution of stock over the pasture in which this reservoir is located would relieve the grazing pressure on this drainage and allow the range some amount of recovery. Salting away from the water is just one device to help achieve better distribution of stock and construction of other reservoirs on other drainages in the pasture would also be of benefit.

A Description of the Vegetative Composition for the Danks Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	55	Good	Good
Western Wheatgrass	Agropyron smithi	15	Fair	Fair
Sandberg Bluegrass	Poa secunda	5	Fair	Fair
Prairie Sandreed	Calamovilfa longifolia	5	Fair	Fair
Little Bluestem	Andropogon scoparius	T	-	-
Prairie Cordgrass	Spartina pectinata	T	-	-
Inland Saltgrass	Distichlis stricta	T	-	-
Threadleaf Sedge	Carex filifolia	T	-	-
Broom Snakeweed	Gutierrezia sarothrae			
Scarlet Globemallow	Sphaeralcea coccinea			
Knotweed	Polygonum spp.			
Curlycup Gumweed	Grindelia squarrosa			
Cudweed Sagebrush	Artemisia gnaphalodes	10	Fair	Fair
Woolly Indianwheat	Plantago purshi			
Sayfeather	Liatris spp.			
Prairieclover	Petalostemum spp.			
Others				
Big Sagebrush	Artemisia tridentata	5	Fair	Good
Plains Pricklypear	Opuntia polyacantha	3	Fair	Fair
Rubber Rabbitbrush	Chrysothamnus nauseosus	1	Fair	Fair
Douglas Rabbitbrush	Chrysothamnus viscidiflorus	1	Fair	Fair

Mule Creek No. 2 Reservoir - Sec. 3, T. 32 N., R. 61 W., Niobrara County, Wyoming

Black greasewood is spread along the grassy hills on the drainage of this reservoir, which is located on the Pierre shale.

Some bare, decomposed shale areas offer little resistance to erosion, and active sheet and rill erosion are in evidence in these areas and the steeper portions adjoining the drainage bottoms. Headcutting and side bank-cutting are in evidence in the side draws of the main drainage. Active sheet erosion is taking place over the entire drainage and erosion was rated at 3-1-1. When the side banks slough-off, the coarser particles are deposited in the stream-bed, in the grass and weeds just a short distance from the cut, while the finer particles and that portion in suspension are carried down to the reservoir. This form of erosion probably accounts for the majority of silt in the reservoir. Although some of the side draws are headcutting, the area of the cut is rather small. The gully through the main draw is meandering and some bank-cutting is going on.

Cut-up portions of the gullies and side draws were rated as VII land, topography and soils are the limiting factors. The remaining rolling hills and benches were rated as VI land with topography being the limiting factor. All the drainage area is in fair condition, the erosion and unstable soils are keeping the area in a fair condition, even though the area is not grazed year around and is apparently part of a rotation or deferred grazing pasture.

Vegetation over the general area is mostly grass, although there are scattered plants of greasewood and sagebrush. Greasewood does not appear to be of good vigor, as it is somewhat stunted in growth. A wide variety of grasses are growing on this area, ranging from some scattered spots of blue grama sod to a slight cover of bunch grasses.

About seven acres per cow or five sheep per month, since it is primarily a sheep range, is the correct stocking rate. When studied in the fall of 1950, this drainage area had not been used by livestock, it was either being reserved for winter use or as part of a deferred grazing schedule in practice. Other areas near the reservoir had been severely overgrazed.

A Description of the Vegetative Composition for the Mule Creek No. 2 Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	35	Fair	Fair
Western Wheatgrass	Agropyron smithi	10	Fair	Fair
Sandberg Bluegrass	Poa secunda	10	Fair	Fair
Green Needlegrass	Stipa viridula	5	Fair	Fair
Prairie Junegrass	Koeleria cristata	5	Fair	Fair
Prairie Sandreed	Calamovilfa longifolia	5	Fair	Fair
Alkali Sacaton	Sporobolus airoides	1	-	-
Prairie Cordgrass	Spartina pectinata	2	-	-
Inland Saltgrass	Distichlis stricta	7	-	-
Threadleaf Sedge	Carex filifolia	2	-	-
Bearded Slender Wheatgrass	Agropyron spicatum	7	-	-
Broom Snakeweed	Gutierrezia sarothrae			
Curlycup Gumweed	Grindelia squarrosa			
Longleaf Phlox	Phlox longifolia			
Scarlet Globemallow	Sphaeralcea coccinea	10	Fair	Fair
Cocklebur	Xanthium spp.			
Pepperweed	Lepidium spp.			
Others	---			
Black Greasewood	Sarcobatus vermiculatus	10	Poor	Poor
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Rubber Rabbitbrush	Chrysothamnus nauseosus			
Plains Prickly pear	Opuntia polyacantha			
Silver Sagebrush	Artemisia cana	5	Fair	Fair
Fourwing Saltbush	Atriplex canescens			

A Description of the Vegetative Composition for the Mule Creek No. 2 Reservoir

Common Name	Botanical Name	Composition	Use for Cows	Use for Horses
Blue Grass	Poatalyn pratilis	35	Fair	Fair
Western Wheatgrass	Agropyron smithii	10	Fair	Fair
Smallery Bluegrass	Poa secunda	10	Fair	Fair
Green Needlegrass	Stipa viridula	5	Fair	Fair
Prairie Junegrass	Koeleria cristata	5	Fair	Fair
Prairie Sagebrush	Artemisia ludoviciana	5	Fair	Fair
Alkali Sacaton	Sporobolus airoides	3	-	-
Prairie Cordgrass	Spartina pectinata	3	-	-
Inland Saltgrass	Distichlis stricta	3	-	-
Threadleaf Sedge	Carex filifolia	3	-	-
Smartod Dlueleaf				
Wheatgrass	Agropyron spicatum	3	-	-
Green Sprangled	Hilaria jamesii			
Curlycup Gumweed	Grindelia squarrosa			
Longleaf Pulse	Psinon longifolia			
Scarlet Globemallow	Sphaeralcea coccinea	10	Fair	Fair
Cowpiebur	Asclepias spp.			
Peppergrass	Lepidium spp.			
Others	---			
Black Greasewood	Sarcobatus vermiculatus	10	Poor	Poor
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Rubber Rabbitbrush	Chrysothamnus nauseosus			
Plains Prickly-pear	Opuntia polyacantha			
Silver Sagebrush	Artemisia cana	5	Fair	Fair
Scarlet Gaillardia	Aristida purpurea			

Beck Reservoir - Sec. 12, T. 46 N., R. 65 W., Weston County, Wyoming

This area is located on Pierre shale. There is some headcutting about three feet deep. It is the only headcut in the drainage and is very insignificant when compared to the entire area.

Part of the shale seems to go into suspension and cause some slumping. The heavier particles are deposited in the vegetation in the bottom of the draw and only the part in suspension reaches the reservoir. Erosion of the area is classed as 2-1-1.

The area is classed as VI capability with topography the only limiting factor. It is considered to be in fair condition.

The vegetative type is grassland with sagebrush and greasewood coming in. The greasewood is in very poor vigor. Many dead plants were observed and many of the remainder appeared to be very weak. The reason for this is not known, but it appears as if the plants had been sprayed with a herbicide. Carrying capacity was rated at about five acres per A. U. M.

Duck Reservoir - Sec. 12, T. 46 N., R. 22 W., Benton County, Wyoming

This area is located on Elmore creek. There is some meadowland about three feet deep. It is the only bushes in the drainage and is very insignificant when compared to the entire area.

Part of the birds occur in ponds suspension and empty area sloughs. The insects portions are depended in the vegetation in the bottom of the dams and only the pond in suspension reasons the reservoir. Trends of the area is classed as S-1-1.

The area is classed as W capability with beginning the only limiting factor. It is considered to be in fair condition.

The vegetative type is grassland with sagebrush and greasewood covering in. The grassland is in very poor vigor. Many dead plants were observed and many of the remainder appeared to be very weak. The reason for this is not known, but it appears as if the plants had been stressed with a herbicide. Carrying capacity was rated at about five acres per A. U. M.

A Description of the Vegetative Composition for the Bock Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Western Wheatgrass	Agropyron smithi	40	Good	Fair
Blue Grama	Bouteloua gracilis	30	Fair	Fair
Sandberg Bluegrass	Poa secunda	5	Fair	Poor
Prairie Junegrass	Koeleria cristata	T	-	-
Green Needlegrass	Stipa viridula	T	-	-
Needleandthread	Stipa comata	T	-	-
Japanese Brome	Bromus japonicus	T	-	-
Buffalograss	Buchloe dactyloides	T	-	-
Bearded Bluebunch Wheatgrass	Agropyron spicatum	T	-	-
Scarlet Globemallow	Sphaeralcea coccinea			
Annual Atriplex	Atriplex spp.			
Peppergrass	Lepidium spp.			
Broom Snakeweed	Gutierrezia sarothrae			
Longleaf Phlox	Phlox longifolia	10	Fair	Fair
Sunflower	Helianthus spp.			
Lomatium	Lomatium spp.			
Knotweed	Polygonum spp.			
Others				
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Black Greasewood	Sarcobatus vermiculatus	5	Poor	Poor
Plains Prickly pear	Opuntia polyacantha	5	Fair	Fair
Fourwing Saltbush	Atriplex canescens	T	-	-
Rubber Rabbitbush	Chrysothamnus nauseosus	T	-	-

Grasses and desirable forbs are scattered over the area. On the ridges and flats forage plants are increasing, but near the drainage bottoms forage species are scattered; perhaps this is due to a soil condition. Comparable sites will have a more uniform and dense stand of western wheatgrass and a better distribution of grasses over the entire area. Invader plants are held at about a constant percentage over the drainage.

A Description of the Vegetative Composition for the Dock Reservoir

Common Name	Botanical Name	Per Cent Composition	Vigor	Reproduction
Western Hemlock	Asplenium nidus	60	Good	Fair
Blue Grass	Dendrobium gracilis	30	Fair	Fair
Gaudery Blueyrass	Fan escuda	5	Fair	Poor
Prairie Junegrass	Koeleria cristata	1	-	-
Green Needlegrass	Stipa viridula	1	-	-
Needleandthread	Stipa comata	1	-	-
Japanese Brome	Bromus japonicus	1	-	-
Buffalograss	Tumiba dactyloides	1	-	-
Veeried Bluebush				
Wheatgrass	Agropyron elymoides	1	-	-
Scarlet Globemallow-	Sphaeralcea coccinea			
Annual Ryegrass	Lolium rigidum			
Dogwood	Cornus sericea			
Green Ashleaved	Fraxinus pennsylvanica			
Lanyleaf Yucca	Yucca laxifolia	10	Fair	Fair
Sorrel	Rumex acetosella			
Lupine	Lupinus spp.			
Bentgrass	Agrostis spp.			
Others	---			
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Black Greasewood	Sarcobatus vermiculatus	4	Poor	Poor
Plains Prickly-pear	Opuntia polyacantha	4	Fair	Fair
Fourwing Saltbush	Atriplex canescens	1	-	-
Rubber Rabbitbrush	Chrysothamnus nauseosus	1	-	-

Grasses and desirable forbs are scattered over the area. On the ridges and flats forage plants are increasing, but near the drainage bottoms forage species are scattered because this is due to a soil condition. Undesirable sites will have a more uniform and dense stand of western wheatgrass and a better distribution of grasses over the entire area. Invader plants are held at about a constant percentage over the drainage.

Upper Cheyenne River Watershed Studies

Picture No. 9 October 24, 1950

LOCATION: Coyle Reservoir, Sec. 27, T. 45 N., R. 62 W., Weston County, Wyoming.

VIEW: General view of vegetative cover.

COMMENTS: Scattered sagebrush with a grass understory makes up the drainage area at the Coyle Reservoir. The outer fringes of the Black Hills in the background are not a part of the drainage area. Density .3; 4.93 acres per A. U. M.

Upper Cheyenne River Watershed Studies

Picture No. 10 October 24, 1950

LOCATION: Coyle Reservoir, Sec. 27, T. 45 N., R. 62 W., Weston County, Wyoming.

VIEW: Station No. 3

COMMENTS: A typical portion of the vegetation of the Coyle Reservoir. Sagebrush and pricklypear plants are scattered over the area, with western wheatgrass and blue grama being the most abundant plants present. Six (6) inch scale is by the stake. Density 13; 4.93 acres per A. U. M.

Coyle Reservoir - Sec. 27, T. 48 N., R. 62 W., Weston County, Wyoming

This sagebrush land is on Pierre shale. The soil is quite gravelly and is not eroding very badly. There is no gully erosion and the vegetation seems to be very effective in holding the soil in place. Permeability should be very good due to the amount of gravel in the soil. Erosion has been more severe than it is at present, probably during the drought. At the time of the study the erosion was rated as 2-1-1.

Soil and topography are the limiting factors in capability, which is rated as VI. At present it is considered to be in fair condition and the trend seems to be upward.

Vegetation is of the sagebrush type, (see picture No. 9). The percentage of prickly pear seems to be going down since it was noted that many of the prickly pear clumps were dead and in many more clumps there are only a few living parts. This increased competition would indicate an upward trend in the quality of the vegetation, (see picture No. 10). There are grass remnants in the prickly pear clumps which indicate heavy grazing in the past, but if stocked at the rate of about five acres per A. U. M., it should continue to improve.

Coyle Reservoir - Sec. 27, T. 42 N., R. 62 W., Weston County, Wyoming

This reservoir is on Pierre shale. The soil is quite gravelly and is not eroding very badly. There is no gully erosion and the vegetation seems to be very effective in holding the soil in place. Permeability should be very good due to the amount of gravel in the soil. Erosion has been more severe than it is at present, probably during the drought. At the time of the study the erosion was rated as 2-1-1.

Soil and topography are the limiting factors in capability, which is rated as VI. At present it is considered to be in fair condition and the trend seems to be upward.

Vegetation is of the sagebrush type, (see picture No. 8). The percentage of prickly-pear seems to be going down since it was noted that many of the prickly-pear clumps were dead and in many more clumps there are only a few living pads. This increased competition would indicate an upward trend in the quality of the vegetation, (see picture No. 10). There are grass remnants in the prickly-pear which indicate heavy grazing in the past, but if stocked at the rate of about five acres per A. U. M., it should continue to improve.

A Description of the Vegetative Composition for the Coyle Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Western Wheatgrass	Agropyron smithi	35	Fair	Fair
Blue Grama	Bouteloua gracilis	30	Fair	Poor
Sandberg Bluegrass	Poa secunda	5	Fair	Fair
Buffalograss	Buchloe dactyloides	T	-	-
Threadleaf Sedge	Carex filifolia	5	Fair	Fair
Sixweeks Fescue	Festuca octoflora	T	-	-
Inland Saltgrass	Distichlis stricta	T	-	-
Japanese Brome	Bromus japonicus	T	-	-
Green Needlegrass	Stipa viridula	T	-	-
Needleandthread	Stipa comata	T	-	-
Scarlet Globemallow	Sphaeralcea coccinea			
Prairie Pepperweed	Lepidium densiflorum			
Longleaf Phlox	Phlox longifolia			
Sunflower	Helianthus spp.			
Locoweed	Locoweed spp.	10	Fair	Fair
Knotweed	Polygonum spp.			
Woolly Indianwheat	Plantago purshi			
Peripsea	Calochortus spp.			
Others	---			
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Black Greasewood	Sarcobatus vermiculatus	5	Fair	Fair
Plains Prickly pear	Opuntia polyacantha	5	Poor	Poor
Common Winterfat	Eurotia lanata	T	-	-

A Description of the Vegetative Composition for the Coyle Reservoir

Common Name	Botanical Name	Composition	Vigor	Reproduction
Western Wheatgrass	Agropyron smithii	35	Fair	Fair
Blue Grama	Bouteloua gracilis	30	Fair	Poor
Needleandthread	Stipa comata	8	Fair	Fair
Buffalograss	Buchloe dactyloides	5	-	-
Threadleaf Sedge	Carex filifolia	4	Fair	Fair
Western Yarrow	Achillea lanulosa	3	-	-
Plains Muhly	Muhlenbergia cuspidata	2	-	-
Prairie Coneflower	Ratibida columnifera	2	-	-
Scarlet Globemallow	Sphaeralcea coccinea	2	-	-
Fringed Sagebrush	Artemisia frigida	1	-	-
Sun Sedge	Carex inops	1	-	-
Needleleaf Sedge	Carex duriuscula	1	-	-
Prairie Coneflower	Ratibida columnifera	1	-	-
Scarlet Globemallow	Sphaeralcea coccinea	1	-	-
Fringed Sagebrush	Artemisia frigida	1	-	-
Sun Sedge	Carex inops	1	-	-
Needleleaf Sedge	Carex duriuscula	1	-	-
Western Wheatgrass	Agropyron smithii	10	Fair	Fair
Blue Grama	Bouteloua gracilis	10	Fair	Fair
Buffalograss	Buchloe dactyloides	5	-	-
Threadleaf Sedge	Carex filifolia	4	Fair	Fair
Western Yarrow	Achillea lanulosa	3	-	-
Plains Muhly	Muhlenbergia cuspidata	2	-	-
Prairie Coneflower	Ratibida columnifera	2	-	-
Scarlet Globemallow	Sphaeralcea coccinea	2

David Reservoir - Sec. 6, T. 7, R. 56 W., 5th P.M., Niobrara County, Wyoming

This reservoir area drains from two different geological formations, the Pierre shale and the Fox Hill sandstone. Most of the erosion appears to come from the shale. Where the benches break at the edge of the draw there appears to be considerably more sheet erosion. "Cat steps" up the bottom of the draw indicate past erosion, however, at present, no silt appears to be coming from this bottom since it is very well healed. Erosion on the flats was rated as 2-1-1, while the area between the tablelands and the draw was rated as 3-1-1.

Capability of the flats was rated as VI and the portion in the Fox Hills formation was rated VII, with topography being the limiting factor. The condition of the entire area was considered fair. It was felt that the area could produce considerably more forage and there should be less prickly-pear. The land supports a grass vegetative type. Grama grass is the dominant species, however, remnants of more desireable species are found in prickly pear clumps, where they have been driven by grazing pressure. Japanese brome is invading in some areas. Carrying capacity on the VI land is estimated at about five acres per A. U. M. and on the VII portion about five and one-half acres per A. U. M.

A Description of the Vegetative Composition for the David Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	45	Fair	Fair
Threadleaf Sedge	Carex filifolia	15	Fair	Fair
Western Wheatgrass	Agropyron smithi	10	Fair	Fair
Needleandthread	Stipa comata	5	Fair	Poor
Prairie Junegrass	Koeleria cristata	5	Fair	Poor
Japanese Brome	Bromus japonicus	5	Fair	Fair
Fendler Threeawn	Aristida fendleriana	T	-	-
Green Needlegrass	Stipa viridula	T	-	-
Inland Saltgrass	Distichlis stricta	T	-	-
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Sixweeks Fescue	Festuca octoflora	T	-	-
Cheatgrass Brome	Bromus tectorum	T	-	-
Buffalograss	Buchloe dactyloides	T	-	-
Longleaf Phlox	Phlox longifolia			
Fringed Sagebrush	Artemisia frigida			
Pussytoes	Antennaria spp.			
Woolly Indianwheat	Plantago purshi	10	Fair	Fair
Prairie Pepperweed	Lepidium densiflorum			
Common Breadroot Scurfpea	Psoralea esculenta			
Eriogonum	Eriogonum spp.			
Others	---			
Plains Pricklypear	Opuntia polyacantha	5	Fair	Fair
Silver Sagebrush	Artemisia cana	T	-	-

A Description of the Vegetative Composition for the Reid Reservoir

Common Name	Scientific Name	Per Cent Composition	Value	Reproduction
Blue Grass	Bouteloua gracilis	40	Fair	Fair
Threadleaf Sedge	Carex filifolia	35	Fair	Fair
Western Wheatgrass	Agropyron smithii	10	Fair	Fair
Needleandthread	Stipa comata	8	Fair	Poor
Prairie Junegrass	Koeleria cristata	5	Fair	Poor
Japanese Brome	Bromus japonicus	5	Fair	Fair
Prairie Threeawn	Aristida fendleriana	5	-	-
Green Needlegrass	Stipa viridula	5	-	-
Indian Ricegrass	Stipa hymenoides	5	-	-
Indian Millet	Eriochloa contracta	5	-	-
Sideoats Grama	Bouteloua curtipendula	5	-	-
Western Wheatgrass	Agropyron smithii	5	-	-
Sandberg Bluegrass	Poa secunda	5	-	-
Buffalograss	Buchloe dactyloides	5	-	-
Leafy Aster	Aster laevis			
Prairie Coneflower	Ratibida columnifera			
Scarlet Gaura	Gaura coccinea			
Western Ragweed	Ambrosia psilostachya			
Blacky Indianbrush	Plantago purshii	10	Fair	Fair
Prairie Peppergrass	Lepidium densiflorum			
Common Broomroot Scurfpea	Psoralea esculenta			
Stipa comata	Stipa comata type			
Others	---			
Plains Prickly Pear	Opuntia polyacantha	8	Fair	Fair
Silver Sagebrush	Artemisia cana	7	-	-

Johnson Reservoir - Sec. 23, T. 33 N., R. 64 W., Niobrara County, Wyoming

Mr. Johnson's reservoir is located on the Pierre shale while the upper part of the drainage is in the White River formation. Unlike any of the other areas, this one drains through an oil field (the East Lance Creek). The main drainage through the oil field is gullied, while the side drainages have only healed-over gullies and "cat steps" to indicate past erosion of any extent. That part of the main drainage through the oil field is considered to be 2-1-3 on erosion. The flat portion outside the oil field was classed as 2-1-1; while the White River area, which is steeper, is classed as 3-1-2.

The Pierre shale area is classed as VI capability and the steeper White River formation is classed as VII. Topography is the limiting factor on both.

The land supports a grassland vegetative type with a carrying capacity of six acres per A. U. M. There is some prickly-pear and Japanese brome, but these are not abundant enough to cause concern. With an oil field on the area, there is not much that can be done to improve conditions on the main part of the drainage.

A Description of the Vegetative Composition for the Johnson Reservoir

Common Name	Scientific Name	Per Cent Composition	Vigor	Reproduction
Blue Grama	Bouteloua gracilis	35	Fair	Fair
Threadleaf Sedge	Carex filifolia	10	Fair	Fair
Western Wheatgrass	Agropyron smithi	20	Fair	Fair
Japanese Brome	Bromus japonicus	5	Fair	Fair
Sandberg Bluegrass	Poa secunda	5	Fair	Fair
Green Needlegrass	Stipa viridula	T	-	-
Indian Ricegrass	Oryzopsis hymenoides	T	-	-
Fendler Threeawn	Aristida fendleriana	T	-	-
Broom Snakeweed	Gutierrezia sarothrae	5	Fair	Good
Scarlet Globemallow	Sphaeralcea coccinea			
Longleaf Phlox	Phlox longifolia			
Pussytoes	Antennaria spp.			
Eriogonum	Eriogonum spp.	10	Fair	Fair
Fringed Sagebrush	Artemisia frigida			
Selaginella	Selaginella spp.			
Others				
Plains Pricklypear	Opuntia polyacantha	5	Fair	Fair
Big Sagebrush	Artemisia tridentata	5	Fair	Fair
Silver Sagebrush	Artemisia cana	2	Fair	Fair
Black Greasewood	Sarcobatus vermiculatus	T	-	-
Eastern Poplar	Populus deltoides	T	-	-

Grazing pressure on the drainage area probably is not too great; most of the disturbances to the vegetation are man-caused from the activity around the oil field.

A Description of the Vegetative Composition for the Johnson Reservoir

Common Name	Botanical Name	Per Cent Composition	Value for Sedimentation	Bank Protection
Blue Grass	Bouteloua gracilis	32	Fair	Fair
Perennial Sedge	Carex filifolia	10	Fair	Fair
Western Wheatgrass	Agropyron smithii	30	Fair	Fair
Japanese Brome	Bromus japonicus	8	Fair	Fair
Needle Sleepgrass	Poa secunda	8	Fair	Fair
Green Needlegrass	Stipa viridula	2	-	-
Indian Ricegrass	Oryzopsis hymenoides	2	-	-
Prairie Sagewort	Artemisia ludoviciana	2	-	-
Upland Goldenweed	Chrysothamnus graveolens	8	Fair	Good
Scarlet Globemallow	Sphaeralcea coccinea			
Sawtooth Plum	Plum Angustifolia			
Peachbrush	Kahomeria sp.			
Syringa	Syringa sp.	10	Fair	Fair
Fringed Sagebrush	Artemisia frigida			
Caliginella	Salsoginella spp.			
Cholla	----			
Plains Prickly-pear	Opuntia polyacantha	8	Fair	Fair
Silky Sagebrush	Artemisia gridoniana	2	Fair	Fair
Silver Sagebrush	Artemisia cana	2	Fair	Fair
Black Greasewood	Sarcobatus vermiculatus	2	-	-
Rabbit Brush	Chrysothamnus nauseosus	1	-	-

Special Measures on the drainage area probably is not the result of the disturbances to the vegetation are removed from the activity around the oil field.

SUMMARY OF AREAS BY GEOLOGICAL FORMATIONS

White River

Three vegetative types were found in this formation, grassland, conifer and waste. The majority of the grassland types were found to be in good condition, the rest being in fair condition. Of the three areas of conifer only one was classified as being in good condition, the other two were classified as fair. The barren type is completely denuded and worthless for any purpose. There were no areas of broken sod in this formation. It seems to support either a good sod or, once the cover is broken, it rapidly erodes to parent material.

Erosion varies from none to slight and severe to critical. The most erosion, of course, comes from the barren lands, while the least erosion was found on a field of crested wheatgrass.

Capability included all classes from IV to VIII with the majority in class VI.

Creneros Shale

Only one reservoir was studied on this formation. It was a grassland type in fair condition. Better stock distribution would definately improve this type.

The flats were rated as VI capability while the edge of the draw was rated as VII.

Erosion on the VI land was rated 2-1-1 and 3-1-1 on the VII land.

Lance Shale

Eleven of the 24 reservoirs studied were on the Lance formation. Sagebrush and grassland types were found and only two were found to be in good condition, the others were only fair.

The capability ranged from IV to VII. Many of the areas were in rolling to rough hills, so topography was the limiting factor. Erosion was rated from 1-1-1 to 3-1-2 with the major part being classed as 2-1-1.

White River

These vegetative types were found in this formation, grassland, conifer and waste. The majority of the grassland types were found to be in good condition, the rest being in fair condition. Of the three areas of conifer only one was classified as being in good condition, the other two were classified as fair. The barren type is completely denuded and worthless for any purpose. There were no areas of broken and in this formation, it seems to support either a good and or, once the cover is broken, it readily erodes to parent material.

Erosion varies from none to slight and severe to critical. The most erosion, of course, occurs from the barren lands, while the least erosion was found on a field of wrested vegetation.

Topography included all classes from IV to VIII with the majority in class VI.

Pressure Basin

Only one reservoir was studied on this formation. It was a grassland type in fair condition. Better stock distribution would definately improve this type.

The flats were rated as it capability with the edge of the draw was rated as VI.

Areas on the VI land was rated 3-1-1 and 3-1-4 on the VII land.

Lance Creek

Eleven of the 24 reservoirs studied were on the Lance formation. Pegetvan and grassland types were found and only two were found to be in good condition, the others were only fair.

The capability ranged from IV to VI. Many of the areas were in rated from 1-1-1 to 3-1-3 with the major part being classed as 3-1-1.

Nearly all the range on this formation would benefit from better range management, especially more reservoirs and salting away from water.

Fort Union Shale

Three drainage areas were studied on this formation. Two of them supported a sagebrush type in fair condition and the third was a grassland type in good condition.

Capability on one area was rated as VII and the others as VI. Erosion was from 2-1-1 to 3-1-2.

Pierre Shale

Five reservoirs were on the Pierre shale and on two of these a part of the drainage was through either the White River or Fox Hills formations.

Capability was of VI and VII classes with some in good condition.

Erosion ranged from 2-1-1 to 3-1-2.

PHOTO STATIONS ESTABLISHED ON THE FOUR RESERVOIRS

STUDY RESERVOIRS

Photo Station No. 1

Andrews Reservoir, Sec. 6, T. 32 N., R. 58 W., Sioux County, Nebraska

Photo station is identified by two (2) wooden stakes driven into the ground with about two (2) inches still protruding, one stake is marked focal point and the other camera point, with the photo point being about eight (8) feet east of the camera point. The point is located about 1/4 mile up the drainage from the Andrews Reservoir, being on a ridge point between the first drainage tributary from the right draining the cropped wheatfield and the main drainage from Pine Ridge. A road passes about 200 yards west of the photo point and a fence corner is located about 150 feet to the northeast in the bottom of the draw.

Photo Station No. 2

U. S. Government Reservoir, Sec. 29, T. 44 N., R. 64 W., Weston County, Wyoming

Photo station is identified by two (2) wooden stakes driven into the ground with about two (2) inches still protruding; the stake to the north is the photo point and the other the camera point. A fence corner is located northwest of the reservoir, continuing on line with the east-west fence to a point about 150 yards west of the fence corner and 90 yards south will locate the photo point. The photo point is north of the main drainage to the reservoir and south of the first tributary of the main drainage which comes from the north.

Photo Station No. 3

Coyle Reservoir, Sec. 27, T. 45 N., R. 62 W., Weston County, Wyoming

Photo station is identified by two (2) wooden stakes driven into the ground with about two (2) inches still protruding; the north stake is the photo point and the other the camera point. A rock monument, about 2½ feet high was erected at a point about 1/4 mile northeast of the reservoir and about 200 feet west of the road; the monument is visible from the road. The photo station is located about 40 yards north of the rock mound.

STUDY RESERVOIRS

Photo Station No. 4

Sellers No. 1 Reservoir, Sec. 2, T. 44 N., R. 63 W., Weston County, Wyoming

Photo station is marked by two (2) wooden stakes driven into the ground with about two (2) inches still protruding; the north stake is the photo point and the other the camera point. A 1/4 corner between Sec. 2 and Sec. 11 is located about 100 yards south of the photo point (the corner is in a fence). The photo point is in line with a fence north of the main drainage to the reservoir.

APPROVED:_____

DATE:_____

APPROVED: _____

DATE: _____

Table I .- Description and definitions of Land Resource Condition Classes

Condition Class	Principal Characteristics Affecting Condition of Range Resource				
	Soils		Vegetation		
	Fertility	Erosion	Presence or absence of inferior species	Vigor	Relative Productivity
Excellent	Good soil, limited by climatic conditions.	No apparent accelerated soil erosion by wind or water and no recent accumulation of silt or debris.	An absence of "invader" species of inferior utility.	Vigorous condition and good reproduction of the more valuable native vegetation.	Maximum (optimum) or near maximum production of high quality vegetation during normal years.
Good	Slightly reduced soil fertility and loss of organic matter and tilth.	Only very minor accelerated sheet & shoe-string erosion or possibly some blowing and minor accumulations.	Slightly increased abundance of inferior species and "invader" plants.	Slightly reduced vigor and reproduction of desirable native vegetation; decreased density of vegetative cover.	Reduced production to between 75 and 90 percent of optimum.
Fair	Moderately to severely depleted soil fertility; poor tilth.	Advanced accelerated erosion evidenced by some gullies, moderate sheet erosion & topsoil loss.	Predominance of less desirable plants. Decided increase of "invader" species.	Moderately reduced vigor and abundance and little or no reproduction of more desirable native vegetation; generally decreased density of perennial cover.	Reduced productivity to between 50 and 75 percent of optimum.
Poor	Severely depleted soil fertility, poor tilth.	Excessive rapid run-off with heavy silt loam, greatly accelerated soil erosion evidenced gullying; topsoil may be lost, subsoil exposed.	Predominance of inferior perennial species or annual vegetation.	Greatly reduced vigor & density of perennial vegetation; most desirable native species may be absent or have high mortality; reproduction absent.	Productivity reduced below 50 percent of optimum.

Table II.- Description and definitions of land-use capability classes 1/

Class	Suitable for	Topography: Slope (percent)	Topography: Character of surface	Characteristic Native Vegetation	Soil Characteristics: Texture	Soil Characteristics: Depth	Soil Characteristics: Relative Salinity	Soil Characteristics: Fertility	Soil Characteristics: Productivity	Soil Characteristics: Drainage	Vulnerability to Erosion	Requisite Special Practices
I	Best type of farming land.	0 to 2		Tall and midgrasses, thrifty sage, deciduous trees	Medium Friable	12" or more; subsoil 36" or more	Negligible	High	Good to high	Good to excellent	Low	None to minor
II	Farming with simple conservation practices	0 to 10	Irregular	Tall, mid and short grasses; Big sage, deciduous trees	Light to heavy; Friable	8" or more; subsoil 36" or more	Negligible to slight	Good to high	Moderate to high	Good	Slight to moderate	Minor to simple practices
III	Farming with complex conservation practices	0 to 10	Irregular	Tall, mid and short grasses; Big sage, rabbit brush, greasewood, coniferous and deciduous trees	Light to heavy; Friable	6" or more; subsoil 24" or more	Slight to moderate	Fair to good	Moderate to high with management	Often poor; may be needed	Moderate to high	Complex practices essential
IV	Limited or occasional cultivation; best for permanent hay or pasture	0 to 15	Irregular or stony	Tall, mid and short grasses; Big sage, rabbit brush, greasewood, coniferous, deciduous trees, salt bush, winter fat and yellow brush	Sandy to clay; porous or tight	6" or more; may have shallow hardpan	Negligible to critical	Poor to good	Poor for row crops; best for hay and pasture	Not justifiable if needed	Moderate to high	Complex and intensive practices with good management
V	Range or woodland; farming only if irrigation water becomes available	0 to 5	Smooth to irregular; may be stony	Tall, mid and short grasses; Big sage, rabbit brush, greasewood, coniferous and deciduous trees. Density .3 or more	Light to heavy; Friable	Good permeability to 24" depth	Negligible to moderate	Good to high	Moderate to high; not over three acres per A. U. M.	Usually not a problem	Low	None to minor
VI	Range and woodland only	0 to 20 (greater only on good soils)	Irregular to rough or rocky	Tall, mid and short grasses; Big sage, rabbit brush, greasewood, coniferous, deciduous trees, salt bush, winter fat and yellow brush. Density .3 or more	Very light to heavy	Shallow to moderate; permeability excessive to poor	Negligible to moderate	Fair to good	Light to moderate; 3-10 acres per A.U.M.	Not practicable if a problem	Moderate	Proper management with simple restrictions
VII	Range and woodland with severe restrictions	0 to 100	Rough, rocky or eroded	Tall, mid and short grasses; Big sage, rabbit brush, greasewood, coniferous, deciduous trees, salt bush, winter fat, yellow brush, mountain browse and annuals. Density under .3	Usually tight clay or open sand or gravel	Usually shallow poorly developed	Negligible to critical	May be poor	Poor to light; over 10 acres per A.U.M.	Seldom a problem or not practicable	High	Proper management with complex restrictions & intensive practices
VIII	Watershed, wildlife and recreation	Generally steep	Extremely rough, barren or inaccessible	Often only annuals or scanty perennials; may be dense coniferous timber	Usually poorly developed	Very shallow or nil	May be excessive for plant growth	Usually very low	Usually very low or nil	Often poor; not justifiable if a problem	High (unless a swamp)	Complete protection

1/ Adapted from Soil Conservation Service Standards, U. S. Department of Agriculture. Any one of the factors listed may classify a soil, factors determining classification singly and not necessarily in combination.

Table III .- Description and definitions of soil erosion condition classes

Erosion Class	Description of degree of erosion	Sheet Erosion	Wind Erosion	Gully Erosion
1	None to Slight	0-10 percent of topsoil removed. Little apparent evidence of surface erosion and then only localized areas too small to delineate into Class 2. Vegetation often climax type. Generally smooth to gently undulating plains and forested lands; dominantly 0-3 percent slopes.	None to only local evidence of slight soil drift or surface soil removal. 0-10 percent of topsoil removed. Soil usually well protected by sod or plant litter.	No evidence of active gullying. All waterways well established.
2	Slight to Moderate	10-25 percent of topsoil removed, but with little evidence of vegetation breaking up. Slopes generally moderate; characterized by climax type of vegetation with few annual weeds and of usually lower density than vegetation in Class 1 above.	Local evidence of slight to moderate soil drifting and surface soil removal and/or accumulation. Most soil types, particularly the silty and fine sandy textured soils under certain conditions of culture and drought combined with high winds, are subject to this form of soil deterioration.	Occasional active gullies which are usually shallow, occuring primarily along main watercourses at intervals of more than 100 feet. In open areas and where slopes permit, little difficulty in traversing the area in a car.
3	Moderate to Severe	25-50 percent of topsoil removed. "Cat steps" and terraces noticeable on slopes which may be moderate to steep. Bare spots are quite common. Undesirable weeds and plants are beginning to dominate the vegetation with climax types more often scattered than dominant. Perennial woody plants frequently pedestalled. Subsoil rarely exposed except in localized areas.	Bare spots common and areas generally more consistently subject to damage by soil blowing. Soils often removed to depths of 1 to 4 inches and drift accumulations and hummocks noticeable. Sod grass deterioration and plant pedestals in evidence and plant cover is insufficient for soil protection. Subsoil occasionally exposed and soils containing gravel show pavement appearance.	Occasional gullies shallow or deep occuring at intervals of more than 100 feet apart. Concentration of run-off and drainage channeling generally due to steepness of slope. Main water courses deeply channeled, generally U-shaped with tributaries usually V-shaped. Moderate difficulty in traversing area in car, ordinarily having to "head" gully in crossing. Generally associated with extensive shoe-string or rill gullying.
4	Severe to Critical	50-100 percent of topsoil removed and subsoil may be exposed in many places and is being removed to varying depths. Bare spots and trampled out areas common and plant pedestalling and erosion pavement highly evidenced. Loss of surface soil may be complete, associated with active gullying and high mortality of climax species of vegetation. Annual and perennial invaders may dominate the vegetation.	Majority of topsoil may be removed; usually accompanied by destructive accumulations in form of hummocks and dunes particularly along such obstructions as fences and edges of drainageways. Perennial vegetation often scanty and extensively pedestalled.	Frequent, usually shallow, gullies occuring at intervals of less than 100 feet apart. Main waterways deeply channeled and undergoing active gullying, usually U-shaped. Areas often incised by shoestring gullies and rills but are not generally so numerous or deep as to destroy the land completely but dissection permits rapid drainage of surface water. Corduroyed surface makes car travel impossible.
5	Critical to Extreme	Usually all the surface soil has been removed and utility and productivity of land has been largely destroyed by advanced stages of gully erosion which usually continues and retirement from use is, therefore, mandatory. Barren wastelands are often in this class. Desirable perennials never have occupied the area or have been practically obliterated and low density of annuals usually predominates.	Represents a condition of soil deterioration amounting to essential destruction. Retirement from further use is mandatory and artificial treatment is often essential to soil stabilization. Constantly shifting dunes are common. Deep fine sandy soils usually predominate in areas so classified.	Frequent and deep gullies. Generally represents maximum destruction by erosion. Complete and rapid drainage of surface water and soil moisture effected through intricate dissection of soil by gullies. Deeply channeled waterways with edges broken and caved in. Gully banks, slopes and bottoms in active erosion stage.

Table III.- Description and definitions of soil erosion condition classes

Erosion Class	Description of degree of erosion	Sheet Erosion	Wind Erosion	Gully Erosion
1	None to Slight	0-10 percent of topsoil removed. Little apparent evidence of surface erosion and then only localized areas too small to delineate into Class 2. Vegetation often climax type. Generally smooth to gently undulating plains and forested lands; dominantly 0-3 percent slopes.	None to only local evidence of slight soil drift or surface soil removal. 0-10 percent of topsoil removed. Soil usually well protected by sod or plant litter.	No evidence of active gullying. All waterways well established.
2	Slight to Moderate	10-25 percent of topsoil removed, but with little evidence of vegetation breaking up. Slopes generally moderate; characterized by climax type of vegetation with few annual weeds and of usually lower density than vegetation in Class 1 above.	Local evidence of slight to moderate soil drifting and surface soil removal and/or accumulation. Most soil types, particularly the silty and fine sandy textured soils under certain conditions of culture and drought combined with high winds, are subject to this form of soil deterioration.	Occasional active gullies which are usually shallow, occuring primarily along main watercourses at intervals of more than 100 feet. In open areas and where slopes permit, little difficulty in traversing the area in a car.
3	Moderate to Severe	25-50 percent of topsoil removed. "Cat steps" and terraces noticeable on slopes which may be moderate to steep. Bare spots are quite common. Undesirable weeds and plants are beginning to dominate the vegetation with climax types more often scattered than dominant. Perennial woody plants frequently pedestalled. Subsoil rarely exposed except in localized areas.	Bare spots common and areas generally more consistently subject to damage by soil blowing. Soils often removed to depths of 1 to 4 inches and drift accumulations and hummocks noticeable. Sod grass deterioration and plant pedestals in evidence and plant cover is insufficient for soil protection. Subsoil occasionally exposed and soils containing gravel show pavement appearance.	Occasional gullies shallow or deep occuring at intervals of more than 100 feet apart. Concentration of run-off and drainage channeling generally due to steepness of slope. Main water courses deeply channeled, generally U-shaped with tributaries usually V-shaped. Moderate difficulty in traversing area in car, ordinarily having to "head" gully in crossing. Generally associated with extensive shoe-string or rill gullying.
4	Severe to Critical	50-100 percent of topsoil removed and subsoil may be exposed in many places and is being removed to varying depths. Bare spots and trampled out areas common and plant pedestalling and erosion pavement highly evidenced. Loss of surface soil may be complete, associated with active gullying and high mortality of climax species of vegetation. Annual and perennial invaders may dominate the vegetation.	Majority of topsoil may be removed; usually accompanied by destructive accumulations in form of hummocks and dunes particularly along such obstructions as fences and edges of drainageways. Perennial vegetation often scanty and extensively pedestalled.	Frequent, usually shallow, gullies occuring at intervals of less than 100 feet apart. Main waterways deeply channeled and undergoing active gullying, usually U-shaped. Areas often incised by shoestring gullies and rills but are not generally so numerous or deep as to destroy the land completely but dissection permits rapid drainage of surface water. Corduroyed surface makes car travel impossible.
5	Critical to Extreme	Usually all the surface soil has been removed and utility and productivity of land has been largely destroyed by advanced stages of gully erosion which usually continues and retirement from use is, therefore, mandatory. Barren wastelands are often in this class. Desirable perennials never have occupied the area or have been practically obliterated and low density of annuals usually predominates.	Represents a condition of soil deterioration amounting to essential destruction. Retirement from further use is mandatory and artificial treatment is often essential to soil stabilization. Constantly shifting dunes are common. Deep fine sandy soils usually predominate in areas so classified.	Frequent and deep gullies. Generally represents maximum destruction by erosion. Complete and rapid drainage of surface water and soil moisture effected through intricate dissection of soil by gullies. Deeply channeled waterways with edges broken and caved in. Gully banks, slopes and bottoms in active erosion stage.

Table 4 - Land classification analysis of 24 randomly selected reservoirs in the Angostura drainage

Name	Location	Geological Formation	Erosion 1/	Land Capability 2/	Condition 3/	Vegetative Type	Surface Acres per A.U.M. 4/
Andrews*	T. 32 N., R. 55 W., Sec. 6 Nebraska	White River	4-1-3 gully	VIII ts	-	Barren	-
			3-1-1 slopes	VI t	Good	Grass	1.68
			2-1-1 flats	V t	Good	Grass	1.68
			3-1-2 gully in timber	VII ts	Fair	Conifer	4.54
			2-1-1 slopes in timber	VI t	Good	Conifer	2.86
Schaefer	T. 32 N., R. 56 W., Sec. 12 Nebraska	White River	3-1-2 slopes	VII ts	Fair	Conifer	4.23
			2-1-1 benches	VI t	Good	Grass	2.67
Kimbrough	T. 35 N., R. 64 W., Sec. 24 Wyoming	White River	4-1-4 badlands	VIII ts	-	Barren	-
			3-1-1 benches	VI s	Fair	Grass	6.33
			2-1-1 hayland	V ts	Fair	Hayland	
Coffee	T. 33 N., R. 56 W., Sec. 21 Nebraska	White River	4-1-3 gully	VIII st	-	Barren	-
			2-1-1 native grass	VI t	Good	Grass	1.15
			1-1-1 hayland	IV t	Good	Hayland	
Danks	T. 10 S., R. 4 E., Sec. 17 So. Dak.	Graneros Shale	3-1-1 breaks	VII st	Fair	Grass	3.00
			2-1-1 benches	VI ts	Fair	Grass	2.73
Manning #1	T. 35 N., R. 66 W., Sec. 2, 11 Wyoming	Lance	3-1-1	VII t	Fair	Sagebrush	3.93
Manning #2	T. 35 N., R. 66 W., Sec. 15, 16 Wyoming	Lance	3-1-2	VII t	Fair	Sagebrush	3.93
Joss	T. 35 N., R. 67 W., Sec. 3 Wyoming	Lance	3-1-2 breaks	VII ts	Fair	Sagebrush	6.93
			2-1-2 benches	VII ts	Fair	Sagebrush	6.93
Roscoe Ross	T. 38 N., R. 65 W., Sec. 13 Wyoming	Lance	3-1-2 hills	VII t	Fair	Grass	5.34
			3-1-2 flats	VI t	Fair	Grass	5.34
Slagle #1	T. 39 N., R. 66 W., Sec. 27 Wyoming	Lance	2-1-1	VI ts	Fair-Good	Sagebrush	4.19
				VII ts	Fair	Sagebrush	4.19
U. S. Government*	T. 44 N., R. 64 W., Sec. 28 Wyoming	Lance	2-1-1	VI t	Fair	Grass	3.33
Field Brothers	T. 43 N., R. 66 W., Sec. 17 Wyoming	Lance	2-1-1	VI t	Fair	Grass	3.60
Darlington	T. 43 N., R. 67 W., Sec. 13 Wyoming	Lance	2-1-2 gully breaks	VII ts	Fair	Grass	5.80
			2-1-1 benches	VI ts	Fair	Grass	4.88

Table 4 - (Continued)

Name	Location	Geological Formation	Erosion 1/	Land Capability 2/	Condition 3/	Vegetative Type	Surface Acres per A.U.M. 4/
Popham	T. 45 N., R. 67 W., Sec. 24 Wyoming	Lance	2-1-1	VI^{t}	Fair	Grass	3.97
Sellers #1*	T. 44 N., R. 66 W., Sec. 2 Wyoming	Lance	2-1-1 hills	VI^{t}	Fair-Good	Sagebrush	4.23
			1-1-1 flats	V^{s}	Good	Grass	2.10
			1-1-1 hayland	IV^{t}	Good	Hayland	
Sellers #2	T. 45 N., R. 67 W., Sec. 36 Wyoming	Lance	2-1-1 2-1-2 gully	VI^{t}	Fair	Grass	3.79
Schmitt Brothers	T. 40 N., R. 67 W., Sec. 25 Wyoming	Ft. Union	2-1-2	VI^{t}	Fair	Sagebrush	4.80
Slagle #2	T. 39 N., R. 66 W., Sec. 29 Wyoming	Ft. Union	2-1-1 benches 3-1-1 gullies & bottomland	VI^{t}	Good	Grass	3.41
Lee Moore	T. 36 N., R. 68 W., Sec. 17 Wyoming	Ft. Union	3-1-2	VII^{st}	Fair	Sagebrush	6.94
Coyle*	T. 45 N., R. 62 W., Sec. 27 Wyoming	Pierre Shale	2-1-1	VI^{st}	Fair	Sagebrush	4.93
Bock	T. 45 N., R. 63 W., Sec. 12 Wyoming	Pierre Shale	2-1-1	VI^{t}	Fair	Grass	4.89
Mule Creek #2	T. 38 N., R. 61 W., Sec. 3 Wyoming	Pierre Shale	3-1-1	VI^{t}	Fair	Grass	6.94
				VII^{ts}	Fair	Grass	6.94
Johnson	T. 36 N., R. 64 W., Sec. 23 Wyoming	Pierre Shale and White River	2-1-1 flats	VI^{t}	Fair	Grass	5.33
			2-1-3 gully	VII^{t}	Fair	Grass	5.93
			3-1-2 White River	VII^{t}	Fair	Grass	5.93
David	T. 36 N., R. 63 W., Sec. 6, 7 Wyoming	Pierre Shale and Fox Hills	2-1-1 flats	VI^{t}	Fair	Grass	4.76
			3-1-1 slopes to draw	VII^{t}	Fair	Grass	5.29

* Permanent study reservoirs.

1/ Erosion Descriptions: 1-none to slight, 2-slight to moderate, 3-moderate to severe, 4-severe to critical, 5-critical to extreme. The first number indicates sheet erosion, the second wind and the third gully erosion; thus, 2-1-3 means slight to moderate sheet erosion, none to slight wind erosion and moderate to severe gully erosion. See Table III.- Description and definitions of soil erosion condition classes.

2/ Land capability descriptions: I, II, III-classes of farming land, IV-irregular or stony, limited cultivation, V-range or woodland; smooth to irregular, may be stony, VI-range or woodland; irregular to rough or rocky, VII-range or woodland; rough, rocky or eroded, VIII-waste; extremely rough, barren or inaccessible. See Table II.- Description and definitions of land-use capability classes. The exponents ^{ts} denote the limiting factors: ^{t}-topography, ^{s}-soil, etc.

3/ See Table I.- Description and definitions of land resource condition classes.

4/ Surface acres per A. U. M. means the number of surface acres required to carry one (1) mature cow for one (1) month.

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